

Working Paper

Five Facts About Inflation Expectations: Evidence from Four Different Groups of Agents

Norges Bank Research

Authors:

Eleonora Granziera

Lovisa Reiche

Nicolò Maffei-Faccioli

Michael Weber

Tuva Fastbø

Keywords

Inflation Expectations, Wage

Expectations, Households, Firms,

Professional Forecasters, Unions

Working papers fra Norges Bank, fra 1992/1 til 2009/2 kan bestilles på e-post: servicesenter@norges-bank.no

Fra 1999 og senere er publikasjonene tilgjengelige på <http://www.norges-bank.no>

Working papers inneholder forskningsarbeider og utredninger som vanligvis ikke har fått sin endelige form. Hensikten er blant annet at forfatteren kan motta kommentarer fra kolleger og andre interesserte. Synspunkter og konklusjoner i arbeidene står for forfatternes regning.

Working papers from Norges Bank, from 1992/1 to 2009/2 can be ordered by e-mail: servicesenter@norges-bank.no

Working papers from 1999 onwards are available on www.norges-bank.no

Norges Bank's working papers present research projects and reports (not usually in their final form) and are intended inter alia to enable the author to benefit from the comments of colleagues and other interested parties. Views and conclusions expressed in working papers are the responsibility of the authors alone.

ISSN 1502-8143 (online)

ISBN 978-82-8379-366-6 (online)

Five Facts About Inflation Expectations: Evidence from Four Different Groups of Agents*

Eleonora Granziera^{†1}, Lovisa Reiche²,
Nicolò Maffei-Faccioli³, Michael Weber⁴, and Tuva Fastbø⁵

^{1,3,5}Norges Bank

²University of Oxford

⁵Purdue University Daniels School of Business

June 22, 2025

Abstract

We establish five facts of how households, firms, social partners (employer organizations and trade unions), and economists (professional forecasters and academics) form inflation expectations using data from a harmonized survey over the same time period from Norway having data both pre and post inflation surge: (i) Households' inflation expectations are typically the highest, followed by firms but the latter groups' average expectations exceeded those of households starting in 2022, whereas social partners and economists form expectations similarly; (ii) a similar pattern arises for disagreement with firms' disagreement surpassing households' in 2022 with important roles for sales and purchasing prices forecasts; (iii) in normal times, we observe a flat term structure of inflation expectations but it became negatively sloped during 2022, especially for households; economists working in financial institutions have the most anchored expectations; (iv) the pass through of inflation expectations to wage growth expectations is substantially below 1 for all agents but increased substantially for firms and economists during the inflation surge; (v) we causally link electricity price shocks to inflation expectations and find a large pass through.

Keywords: Inflation Expectations, Wage Expectations, Households, Firms, Professional Forecasters, Unions.

JEL codes: D84, E31, E52.

*This paper should not be reported as representing the views of Norges Bank. The views expressed are those of the authors and do not necessarily reflect those of Norges Bank. We are grateful to Oliver Coibion, Stefano Eusepi, Brent Meyer, Aysegul Sahin and participants at various conferences and seminars, and an anonymous referee of the Norges Bank working paper series for useful comments and discussions.

[†]Corresponding author; Email: eleonora.granziera@norges-bank.no.

1 Introduction

Subjective expectations of different groups of agents play a central role in modern macroeconomic models. For instance, households’ inflation expectations influence their perceived real returns on investment, thereby shaping their current consumption decisions (Bachmann et al. 2015, Coibion et al. 2022, D’Acunto et al. 2022). Similarly, firms’ beliefs about inflation will determine how they set prices, demand labor, how much to invest and how to finance it (Coibion et al. 2018, Ropele et al. 2022) and, consequently, current inflation, while inflation expectations of employer organizations and trade unions (social partners) affect nominal wage setting. While a growing literature studies how households and firms form inflation expectations alongside professional forecasters¹, no systematic evidence exists on (a) the similarities and differences between the expectations of households, firms and economists over time and across economic environments and (b) how social partners fit into the broader picture.

We address these gaps by using a unique survey of Norwegian households, business leaders, social partners and economists conducted quarterly since 2002. The Norges Bank Expectations’ Survey (NBES) includes data on inflation and wage expectations across various horizons and has two distinct and novel features. First, it is harmonized, ensuring that all agents are surveyed during the same time period using identical questions, under a unified survey design. This harmonization facilitates direct comparisons by exposing all respondents to the same macroeconomic environment and, potentially, the same information set.² Crucially, all agents face similar question design and forms, so that questionnaire features do not affect survey responses (de Bruin et al. 2011, D’Acunto et al. 2023, Becker et al. 2023). This contrasts with the authoritative comparisons presented in Candia, Coibion & Gorodnichenko (2023) where households and firms are interviewed independently of each other with often different forecast horizons, times of elicitation, wordings, and localities with heterogeneous institutional settings. Second, the NBES uniquely includes social partners—a critical group given their significant role in wage-setting and economic coordination—and economists, offering an unparalleled and comprehensive view of economic expectations. Spanning over two decades, this dataset covers a significantly longer time horizon than most existing surveys, allowing for consistent and rigorous comparisons across agents and over periods characterized by potentially different macroeconomic environments, such as periods of low and high inflation.³ The survey meets all the criteria outlined in Coibion et al. (2020) for achieving high quality, benefiting from its large and representative cross-samples, high frequency, long

¹Bachmann et al. 2023 provides a recent overview of this fast growing body of work.

²The surveys are in the field over a period of three weeks that does not coincide with releases of inflation, national accounts or Norges Bank’s policy rate decisions.

³The inflation environment can share the attention agents pay to inflation, see Cavallo et al. (2017), Bracha & Tang (2025), Korenok et al. (2023a), Weber et al. (2025), Pfäuti (2023).

time span, as well as the quantitative formulation of its questions.

Leveraging these unique features, we revisit five stylized facts about inflation expectations, offering new insights into how different agents form and adjust their expectations over time. In particular, we highlight that these facts are not necessarily static, but vary in response to changing macroeconomic conditions, notably in periods of low versus high inflation. The five facts are:

(1) **Level Differences** The literature suggests that firms’ expectations typically fall between those of professional forecasters and households (Candia, Coibion & Gorodnichenko 2023), with households’ and firms’ average expectations systematically exceeding median expectations due to a long right tail (D’Acunto et al. 2023). Our results confirm the findings of Candia, Coibion & Gorodnichenko (2023) for the period spanning 2002–2021 but reveal a notable shift thereafter. Following the inflationary period in 2021, firms’ inflation expectations exceeded those of households and remained higher until Q4 2024, the latest survey wave in our sample. We show that firms and households faced different energy-price shocks due to partial subsidies for households, suggesting that differences in inflation expectations across agents may depend on both the overall inflation level and the specific shocks they experience, consistent with the evidence for households (D’Acunto, Malmendier, Ospina & Weber 2021) but less evidence for firms exists. Furthermore, social partners behave similarly to economists, though their expectations became more skewed in the post-2021 period. During times of heightened inflation, trade unions raise their inflation expectations more than employer organizations, though in most periods, both groups exhibit similar expectations.

(2) **Cross-Sectional Disagreement** Under full-information rational expectations (FIRE), no dispersion in inflation expectations emerges, but, empirically, large dispersion is present (Mankiw et al. 2004). Cross-sectional dispersion of expectations is typically largest for households, followed by firms and professional forecasters (Candia, Coibion & Gorodnichenko 2023). It is time-varying for all agents (Fofana et al. 2024), and systematically related to household and firm characteristics (D’Acunto et al. 2023, Bruine De Bruin et al. 2010, Piccolo et al. 2025, Candia, Coibion & Gorodnichenko 2023, Baumann et al. 2024). So far, the literature has not shown evidence for systematic differences among professional forecasters (Clements et al. 2023) and no evidence exists regarding the disagreement among social partners. Until 2021, the disagreement among households, firms and professional forecasters in Norway resembles that of other surveys. Similarly to the level of inflation expectations, the disagreement among firms rises substantially after 2021 and even exceeds disagreement among households. As documented in other surveys, we find that gender, income and age can impact households’ inflation expectations systematically. For firms, we find large heterogene-

ity across sectors driven mostly by expectations of sales and purchasing prices. The dispersion of social partners is only marginally larger than that of professional forecasters. In general, social partners belonging to employers’ organizations have lower inflation expectations than those belonging to employees’ organizations.

(3) **Term Structure** A growing body of evidence suggests that inflation expectations of both households and firms are largely explained by their perceptions (Weber et al. 2022, D’Acunto & Weber 2024, Candia, Weber, Gorodnichenko & Coibion 2023, Huber et al. 2023). However, the relationship between short-term and long-term inflation expectations—referred to as the term structure of inflation expectations—is less well understood. Candia, Coibion & Gorodnichenko (2023) and D’Acunto et al. (2023), D’Acunto et al. (2024) suggest both firms’ and households’ long-term expectations are related to short-term expectations. Our survey includes inflation perceptions and expectations at the individual level for three time horizons: 12 months ahead (short-term), 2-3 years ahead (medium-term), and 5 years ahead (long-term). This unique dataset allows us to analyze how perceptions influence both short- and medium-term expectations. Until 2021, household inflation perceptions and short-term expectations were closely aligned. However, after 2021, they decoupled, with perceptions rising much faster than expectations. Medium- and long-term expectations consistently exceeded short-term expectations until 2021, when the ranking reversed, resulting in a downward-sloping term structure. For all agents, short-term expectations are key in explaining medium-term expectations, which in turn influence long-term expectations. Moreover, the longer the forecast horizon, the less volatile inflation expectations become. Economists at financial institutions exhibit the most anchored inflation expectations, whereas anchoring is weakest among firms in the building and construction sector.

(4) **Correlation with Wage Expectations** Agents often form their expectations about different macroeconomic variables jointly (Andre et al. 2022, Coibion et al. 2023, Buchheim et al. 2024). For instance, firms, households and trade unions may link their wage expectations to expectations about the nominal price level. This connection influences how households perceive their real wage growth, how firms expect their costs to rise, and, ultimately, how they set prices. Some evidence points to a weak link between firms’ inflation expectations and their expected wage bills (Coibion et al. 2018, Savignac et al. 2024, Baumann et al. 2024, Buchheim et al. 2024, Abberger et al. 2024), potentially due to industry-specific expectations (Andrade et al. 2020). Similarly, the effect of inflation expectations on own income expectations for households appears to be low, with some differences between high- and low-income earners and men and women (Jain et al. 2024, Hajdini et al. 2023, Stantcheva 2024). The existing evidence comes largely from one-off experiments or small samples, with

Jain et al. (2024) being one exception. In this paper, we explore time-variation in the pass-through of inflation expectations and document the pass-through effect for trade unions, key actors in the wage-setting process in Norway. Specifically, we examine how inflation expectations influence personal income expectations (for households), wage bill expectations (for firms), and wage growth expectations (for professional forecasters and trade unions). Our findings show that the pass through is highest for firms and lowest for households. While the pass-through is positive and significant for all agents, it remains substantially below one, limiting concerns of wage-price spirals. We also document substantial time variation in the pass through: before 2021, the pass-through was similar across agents. During the recent inflationary surge, the pass-through decreased for social partners, and it increased substantially for firms and economists and only moderately for households.

(5) **Response to energy shock** While previous studies establish a link between household inflation expectations and oil prices (Coibion & Gorodnichenko 2015, Binder 2018, Kilian & Zhou 2022), little is known about the effect of electricity prices. In a recent paper Reis & Patzelt (2024) estimate that a 1% increase in electricity prices increases inflation expectations of European households by 1.0 to 1.3 basis points. We exploit an electricity price shock that affected Norway differently across its North and South regions. In 2021Q2, energy prices in the South began to diverge significantly from those in the North due to factors exogenous to the Norwegian economy. Prior to this event, inflation expectations of firms in the North and South were aligned but began to diverge following the shock. We estimate that, on average, over the quarters when electricity prices in the North diverged from those in the South, firms in the North had inflation expectations that exceeded those of firms in the South by more than 1%. In contrast, when we repeat the analysis for households, we find no significant difference in their inflation expectations. This outcome can be attributed to the Norwegian government’s electricity support package for households, which was implemented in 2021Q4 and kept electricity bills in the South close to those in the North.

Revisiting these stylized facts is important for several reasons. First, previous comparisons in the literature could not benefit from the same harmonization and did not include social partners, who play a central role in wage-setting and thus in analyzing the wage-inflation pass-through. Moreover, prior comparisons often focused primarily on data collected post-2020, a period marked by significant economic shifts. We show that the time dimension of our dataset is a key factor, as stylized facts are not static, rather they evolve based on the macroeconomic environment. Indeed, many of these facts depend on the level of inflation (Bracha & Tang 2024, Weber et al. 2025, Pfäuti 2023, Korenok et al. 2023b).

The paper is organised as follows. Section 2 describes the surveys. Section 3 revisits five key stylized facts in the literature of inflation expectations and Section 4 concludes.

2 Data

The Norges Bank expectations survey is a nationally representative survey of four groups of relevant stakeholders: households, firms, social partners and economists. The survey has been running quarterly from 2002Q1, with responses at the individual level available from 2012Q1. An external survey company administers the survey on behalf of Norges Bank.⁴

The survey is designed to be representative of the Norwegian population, and the dataset contains a limited number of characteristics about the interviewed households and firms. About 1,000 households are surveyed in each wave and interviews are conducted via telephone.⁵ Respondents are recruited randomly from Norway’s population of age fifteen and above. Households are asked about their gender, age, employment status and location. With regards to the employment status, households can choose between student, employed in the private sector, employed in the public sector, self-employed, unemployed, stay-at-home or retired. Finally, respondents are asked about their region of residence:⁶ Northern Norway, Mid-Norway, Eastern Norway, Western Norway, Southern Norway. Oslo, Norway’s capital and its largest city, is identified as a separate region, though it is located in Eastern Norway.

Firms’ expectations are collected online by interviewing a sample of at least 500 respondents, which consists of CEOs, CFOs and purchasing managers in Norwegian businesses with 20 employees or more. The sample comes from a pre-recruited panel. Firms belong to the manufacturing, building and construction, services or retail sectors.⁷ Firms are also asked about their geographical location, with the same options as for households. Finally, firms are split into small or large, according to the number of employees, with cut-off value of 50.

Economists consist of 40 experts in the financial industry and academia. The former group is therefore comparable to the forecasters included in the Survey of Professional Forecasters of the Federal Reserve Bank of Philadelphia or the European Central Bank.

⁴The survey has been conducted by Ipsos since 2020Q3. The survey was previously carried out by Epinion, Opinion and TNS Gallup.

⁵This sample size corresponds to interviewing one in 5,500 households compared to one in 560,000 households for the Michigan Survey of Consumers and one in 258,000 for the New York FED Survey of Consumer Expectations.

⁶Up to 2014Q4 the postal code was asked.

⁷Firms belonging to the public sector, or firms in the oil or financial sector are excluded from the survey.

Economists in academia are professors of economics or finance employed by Norwegian universities.

Social partners refer to representatives of management and labor working in employer organizations and trade unions. The survey includes about 40 respondents and distinguishes between partners working in the employer or employee organizations. The representatives being interviewed hold key positions in their organizations, such as chief economists, general secretaries and managers. For both economists and social partners the fieldwork is conducted online and respondents stay in the survey for several waves. However, individuals are not linked from survey to survey so the dataset does not have a panel component, but rather a repeated cross-section structure.

Interviews are conducted over a period of about 20 days from the middle of the first month in the quarter to the beginning of the second month in the quarter. The beginning and end date of the interview period are chosen so that no new CPI or National Account release or monetary policy decision take place during the field phase. For example, for the 2024Q2 wave, respondents were surveyed between April 11 and May 2, the monetary policy decision was communicated on May 3 and the National Accounts figures for 2024Q1 were released on May 16. It is important to stress that all groups of agents are interviewed over the same period, and, because no major scheduled announcement about the Norwegian economy is made during the interview period, agents have in principle access to comparable information.

All agents are asked about expected changes in prices twelve months ahead. The question is formulated as: “What do you think the general rise in prices for goods and services will be in 12 months, as measured by the 12-month change in the consumer price index (CPI)?”.⁸ Therefore agents are asked specifically about the change in the overall price level, as measured by the CPI. Other surveys ask either about the *inflation rate*, e.g. the New York Fed and the Bank of Canada Survey of Consumer Expectations, or about the *general increase in prices*, e.g. the European Central Bank Consumer Expectations Survey or the Michigan Survey of Consumers. Both alternative formulations have possible downsides: consumers might not understand the concept of inflation. On the other hand, when asked about prices, consumers might extrapolate from the change in prices of more recently or more frequently purchased goods (D’Acunto, Malmendier, Ospina & Weber 2021). The Norges Bank formulation refers to prices, which is a more familiar concept to consumers, but explicitly ask about prices of goods included in the CPI basket, so even if agents are aware that different price indices exists, they are directly guides to think about overall consumer

⁸The questionnaire is available in section A of the Appendix.

price inflation (Weber et al. 2022). All agents are asked the same questions, which again eases comparisons across groups. The answers are not probed. The only difference among groups is that households are asked a qualitative answer, that is, whether they expect prices to increase, decrease or remain unchanged, before the quantitative question, similarly to the Michigan Consumer Survey. The same question regarding the twelve months ahead change in prices is also asked about price changes two and five years ahead, though this latter question has been introduced only in 2023Q1 for households and firms. Before then, households and firms were asked about their inflation perceptions, i.e. the percentage change in prices over the past twelve months. The question about perceptions has been reintroduced in 2024Q4 for firms.

Expectations are elicited for other variables as well, notably wages. However, the definition of wages and the horizons differ among groups. Households and firms are asked about the expectations for the growth in their personal or own company wages, whereas economists and social partners about the average wage growth in the economy. While households are asked about the twelve month growth in their wage, all other groups are asked about fixed event forecasts, that is, the current and next year. Finally, economists and social partners are asked about five years ahead expected wage growth as well.

Inflation in Norway follows similar dynamics as other advanced economies. Over the sample covered by the survey, CPI All Items inflation in Norway averaged 2.4%, with a minimum of -1.3% in 2004Q1 and a maximum of 6.7% in 2022Q3. These values are comparable to those for US CPI inflation, where the average was 2.5% and the minimum and maximum were -1.6% and 8.6%, respectively.

3 Five stylized facts for four groups of agents

In this section, we study five facts about expectations of different groups of agents using the NBES survey.

3.1 Differences in Level

We start by documenting differences in the level of inflation expectations across different types of agents and time horizons. Figure 1a shows the average 12-month-ahead (short-term) inflation forecast for households, business leaders, economists and social partners made in quarter t , together with the year-over-year CPI inflation realized in that same quarter, i.e. the inflation rate between quarter $t - 4$ and t . The graph shows that the expectations of all agents co-move with actual CPI inflation (grey line). On average, economists have the

lowest expectations, followed closely by social partners.⁹ Among economists, those based in academic institutions tend to report higher inflation forecasts, specifically since 2021, see Figure 1b. Similarly, when disaggregating social partners in employer organizations and trade unions, trade unions representing employees tend to report higher forecasts, but only during the high inflation period. When inflation is low, no systematic difference between the two groups arises, as highlighted in Figure 1b.

For households and business leaders (firms), the ranking is less clear. Until 2021 Q1, households' expectations exceeded those of business leaders. The gap narrowed after 2015, possibly due to a slight change in the survey design. From 2015 onward, the question for households directly asked about price changes for CPI inflation, whereas previously it referred to general prices (business leaders, however, were always asked about CPI inflation). This change in wording has the potential to lower households' inflation expectations on average (Bruine de Bruin et al. 2017). Since 2021 Q1, business leaders expectations have increased beyond those of households.

After discussing differences in the levels of short-term inflation forecasts, a natural question is how well different agents forecast inflation and whether accuracy varies over time. Table 1 reports the forecast accuracy for the different groups of agents and forecast horizons measured as the root mean squared forecast error (RMSFE) and the relative RMSFE compared to the economists group. The left panel shows the results for observations before the latest inflationary episode, up to 2021Q2, whereas the right panel covers the most recent quarters, from 2021Q3 until 2024Q4.¹⁰ During the sample of low and stable inflation (2002Q1-2021Q2), both for one and two year ahead forecast horizons, households have the least accurate forecasts, whereas economists the most accurate. For one year ahead, social partners and business leaders are ranked second and third, respectively. Their accuracy is close to that of economists, though statistically significantly different. The accuracy of all agents worsens substantially during the last fourteen quarters of data, but proportionally more for economists and social partners than for households. In fact, households and business leaders perform the best over the second sample, and the ranking among the other groups reverses due to the fact that both households and business leaders displayed higher inflation expectations during the post-pandemic inflation period. The differences in accuracy are not statistically significant, however, most likely due to the small time of the high inflation period. Because households

⁹The 2-year-ahead (medium-term) inflation forecasts in Figure C.1 in the Appendix displays similar patterns. For households, the question specifies a forecast horizon of 2-3 years ahead.

¹⁰The sample refers to the corresponding forecast errors: i.e. we include in the second sample four quarter ahead forecasts made from 2020Q3 till 2023Q4 and eight quarter ahead made from 2019Q3 till 2022Q4.

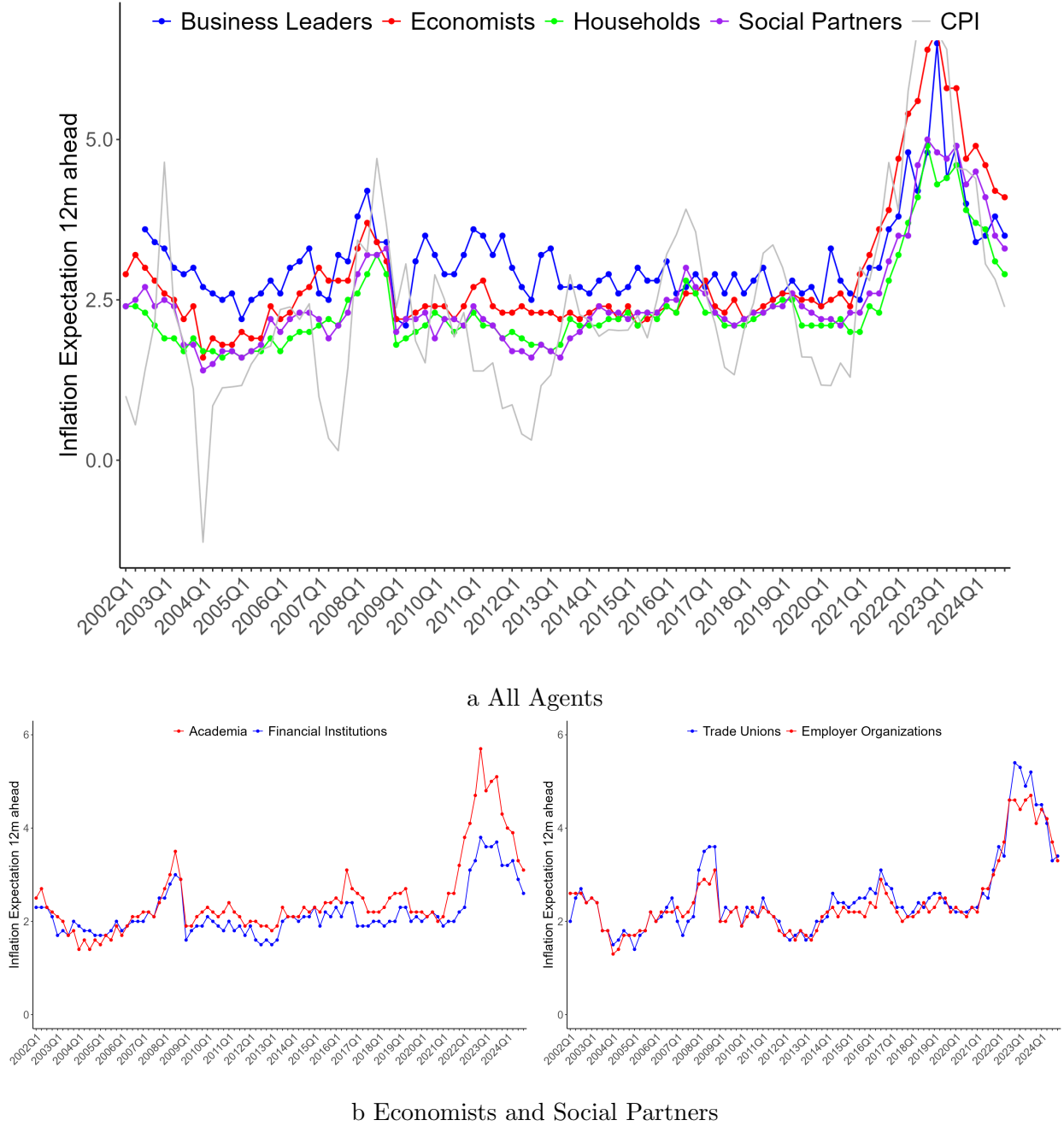


Figure 1: Timeseries of average inflation expectations (12 months ahead) since 2002
Note: The bottom left hand side graph plots academics and financial institutions, the bottom right hand side graph plots employer organizations and trade unions. The grey line in (a) indicates CPI inflation in Norway. The medium-term horizon can be found in the Appendix Figure C.1.

constantly forecast high inflation, it is not surprising that their expectations are very inaccurate during low inflation periods, whereas they become better-aligned with actual inflation during high inflation periods.

Table 1: Accuracy of Inflation Forecasts

	<i>households</i>	<i>business leaders</i>	<i>social partners</i>	<i>economists</i>
Panel A: 2002Q1-2021Q2				
$h = 4$	1.47 1.45***	1.14 1.12*	1.10 1.08**	1.02
$h = 8$	2.24 2.04***	1.57 1.43***	1.17 1.06**	1.10
Panel B: 2021Q3-2024Q4				
$h = 4$	2.08 0.85	2.19 0.89	2.38 0.97	2.46
$h = 8$	1.94 0.67	2.28 0.78	2.67 0.92	2.91

Note: RMSFE (first row) and relative RMSFE (second row) of inflation expectations with respect to the economist groups. ‘hh’: households, ‘bl’: business leaders, ‘sp’: social partners, ‘ec’: all economists. ‘h’ denotes the forecasts horizon in quarters. ‘*’, ‘**’ and ‘***’ indicate significance levels of the Diebold and Mariano test of equal accuracy between each group with respect to the economist group, at the 10, 5 and 1 percent significance respectively.

We now shift our focus to identifying characteristics that may be systematically linked to varying levels of inflation experienced by households and firms, drawing on the rich granularity of the dataset. Table 2 presents the summary statistics of 12-months-ahead inflation expectations by household group for the period of low and high inflation, 2002Q1-2021Q2 and 2021Q3-2024Q4, respectively. For households, women have higher inflation perceptions and expectations than men (Jonung 1981, Bryan & Venkatu 2001, D’Acunto, Malmendier & Weber 2021, Reiche 2025); younger participants have higher inflation perceptions and expectations (though the relationship is somewhat U-shaped, Malmendier & Nagel 2016) and those who are unemployed or students, and therefore on a lower income, have higher inflation perceptions and expectations. Little systematic regional variation of household expectations is present in Norway consistent with evidence for the U.S. (D’Acunto et al. 2023).

For business leaders, in Table 3, we find substantial sectoral variation, with those in the building and construction sector having consistently the highest expectations and those in the service sector the lowest. Firms in the manufacturing sector display the lowest expectations in the low inflation period, and the highest in the high inflation period. No regional differences in the period preceding the inflation-surge while in the second sample

firms in the South display much higher expectations than firms in the North.¹¹ Larger firms have higher inflation expectations in the high inflation period, whereas their expectations are similar to those of small firms in the low inflation sample. Firms seem to extrapolate from individual prices, as firms which reported higher expected purchasing or sale prices have higher expectations than those which reported lower or unchanged prices (Andrade et al. 2020).

Group	2002 Q1 - 2021 Q2			2021 Q3 - 2024 Q4		
	Mean	SD	Observations	Mean	SD	Observations
All	2.93	5.36	38604	4.93	7.9	14070
Age						
< 35 years	3.34	6.87	8906	5.49	9.11	4181
35 to 54 years	2.67	4.65	13118	5.02	7.83	4728
55 to 64 years	2.82	4.76	6517	4.6	7.07	2234
≥ 65 years	3	5.13	10063	4.27	6.7	2927
Sex						
Man	2.71	5.2	29169	4.9	7.99	8817
Woman	3.21	5.55	23505	4.98	7.74	5253
Labor force						
Public_sector	2.84	4.6	9698	4.81	6.87	3016
Private_sector	2.62	4.91	13047	4.96	7.96	6236
Retired	3.12	5.3	10783	4.66	7.48	3285
Unemployed	3.56	9.15	614	5.46	11.43	179
Student	3.55	7.19	3271	5.56	10	1227
Region						
Nord Norge	3.02	5.6	3676	5.22	7.86	1289
Midt Norge	2.92	5.35	5360	4.98	8.8	2014
Østlandet	2.95	5.34	13966	4.96	8.12	4457
Vestlandet	2.91	5.27	8078	4.9	7.38	2925
Sørlandet	2.74	5.71	2308	5.22	7.76	857
Oslo	2.92	5.27	5216	4.63	7.39	2528

Table 2: Summary statistics of inflation expectations 12 months ahead by household group

The findings of this subsection largely confirm existing evidence on level differences in inflation expectations among different agents during periods of low and stable inflation. Specifically, we reaffirm that households tend to have the highest expectations and are the least accurate, whereas economists generally exhibit the lowest expectations and the highest accuracy. Social partners and business leaders typically fall between these extremes, both in

¹¹This can be explained by regional variation in energy prices of firms after 2021 Q3, which we discuss in Section 3.5.

Group	2002 Q1 - 2021 Q2			2021 Q3 - 2024 Q4		
	Mean	SD	Observations	Mean	SD	Observations
All	2.78	3.34	22319	7.03	9.41	8164
Number of employees						
Less than 50	2.83	3.39	10410	6.69	8	2928
Greater than 50	2.75	3.31	11875	7.21	10.11	5235
Sector						
Manufacturing	2.68	2.98	4995	7.82	11.41	1763
Retail and trade	2.86	3.21	4513	6.57	7.72	1697
Building and construction	2.94	3.63	3311	7.66	10.06	1395
Services	2.75	3.47	9466	6.56	8.67	3312
Price Expectations						
↑ Sales	3.25	3.77	3019	8.78	11.41	2448
↓ or = Sales	2.69	3.24	19301	6.3	8.33	5716
↑ Purchasing	3.26	3.6	3878	8.85	11.61	3087
↓ or = Purchasing	2.66	3.26	18442	5.95	7.64	5077
Region						
Nord Norge	2.62	2.22	2071	6.09	6.62	520
Midt Norge	2.83	3.24	2488	6.1	6.71	1120
Østlandet	2.77	3.11	7380	7.21	9.68	2672
Vestlandet	2.75	3.38	5056	6.65	7.44	1471
Sørlandet	2.83	4.21	1455	8.05	12.98	334
Oslo	2.86	3.74	3899	7.62	11.23	2047

Table 3: Summary statistics of inflation expectations 12 months ahead by firm group

terms of expectations and accuracy. However, our analysis also highlights notable differences during the recent period of high inflation. In this context, the rankings of accuracy among agents shift, with households and business leaders performing better relative to economists and social partners. Additionally, disaggregating social partners reveals that trade unions report systematically higher expectations during high-inflation periods, a pattern not observed in periods of low inflation, as shown in Figure 1b. The same figure shows that economists have higher short-term expectations than professional forecasters, though the wedge is much larger in high inflation periods. Regarding households, expectations increased proportionally more for males, people 35 to 44 of age and those working in the private sector. Similarly, firms' expectations have become increasingly heterogeneous according to their size, sector and region as shown in Table 3. These findings highlight the importance of considering the role of varying inflation levels when interpreting survey results and comparing expectations across different agents.

We replicate the summary statistics and accuracy comparison for wage expectations at a 12 months horizon in Appendix Tables B.1 (Accuracy), B.2 (Household summary statistics)

and [B.3](#) (Business leaders summary statistics).¹² As for inflation expectations, we observe that younger households and students tend to have higher wage expectations, possibly due to expected improvements in their employment situation. Men tend to have higher wage expectations than women, and private sector workers have higher wage expectations than public workers. The highest wage expectations for households by region are for Oslo, where the largest share of economic activity and jobs are present.

Focusing on business leaders, we observe small differences in terms of size and sector of the firm for the low inflation sample, while we observe somewhat higher expectations for larger firms and the manufacturing sector for the high inflation sample. Firms in the Sørlandet and Oslo regions show the highest wage expectations, the latter in line with households. Interestingly, we don't observe differences in wage expectations based on firms' own sales or purchase prices in the low inflation period, while in the second sample firms which expected an increase in own sale or purchasing prices also expect higher wages. The findings on forecasting accuracy are in line with those for inflation expectations, where economists tend to forecast better than the other agents in the pre-pandemic period, and households display the worst forecasts. However, in the post-pandemic sample, we do not observe the reversal in accuracy seen for inflation: on the contrary, the relative forecast accuracy of households and firms is unchanged or even deteriorates.

3.2 Cross-Sectional Disagreement

In addition to differences in the levels of inflation expectations, we are also interested in the dispersion of agents' expectations and their skewness, particularly because the right tail may provide predictive power for future inflation ([Reis 2021](#)).

[Figure 2](#) displays the interquartile range of inflation expectations of households, business leaders, social partners and economists at short and medium-term horizons. Households have the highest dispersion of forecasts at the short-term horizon, more than twice as high than the dispersion for the other agents until the onset of the inflationary survey, followed by business leaders. Social partners are similar to economists in our sample. With the onset of the rise of inflation, we see both households and business leaders become more dispersed, even doubling the cross-sectional dispersion, whereas both social partners and economists display little change in their disagreement in their inflation outlook.

¹²Due to the different horizons elicited, we compute a weighted average for business leaders, economists and social partners from current and next year expectations.

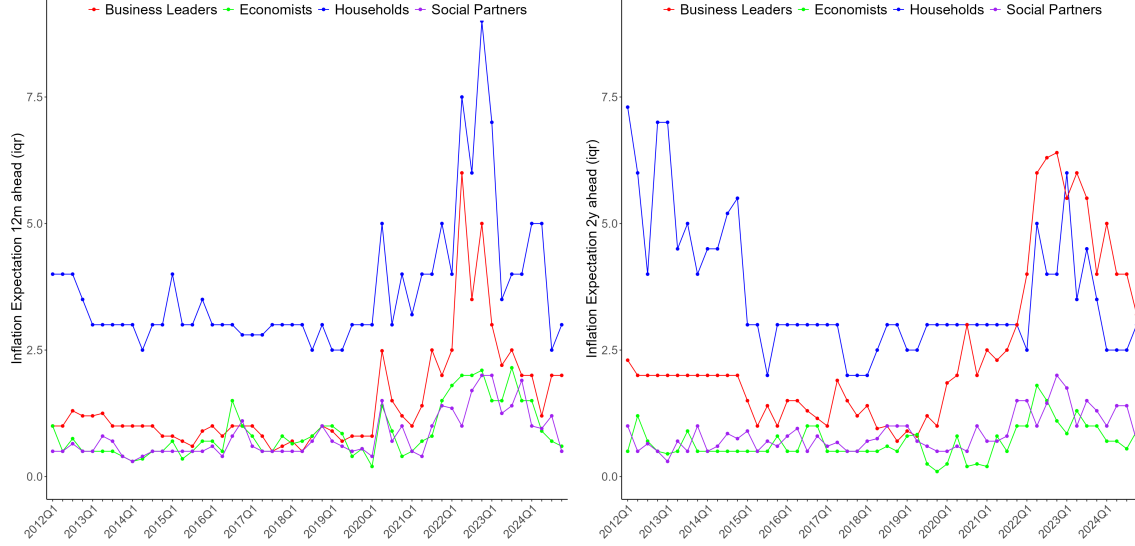


Figure 2: Timeseries of interquartile range of inflation expectations since 2012

Note: The left hand side graphs plot short-term expectations (over the next 12 months) and the right hand side graphs plot medium-term expectations (over the next 2 years).

We observe similar patterns at the medium-term horizon until about 2021Q4 with households and firms having the largest disagreement in their inflation outlook. Starting in 2022, business leaders' dispersion increased more than for households. Sectoral and regional heterogeneity across firms seems to explain the substantial heterogeneity in firms' inflation outlook. Figure C.2 in the Appendix shows firms in the building and construction sector as well as in the manufacturing sector report significantly higher inflation expectations at short and medium term horizons as compared to firms in retail, trade, and services. This sectoral difference largely drives the overall dispersion of firms expectations increases in this period. We will revisit this point below

Again, at the medium-term horizon, little disagreement exists for social partners and economists even during the time period of high inflation.¹³

A complementary way to look at the risk of rising inflation due to a fat right tail of inflation expectations is to focus on the skewness in expectations. We measure skewness as the difference between the average and median forecasts with a positive value indicating a fat right tail and report it in Figure 3. Typically, household expectations exhibit the greatest skewness, a subset of households have very high inflation expectations, followed by those of business leaders, social partners, and economists. Notably, the latter two groups show virtually no skewness on average before the pandemic. However, after 2021, the mean forecasts of business

¹³The dispersion was very large at the start of the time series in 2012 for households (and also larger for business leaders) and decreased after 2015.

leaders exceeded the median more than those of any other agent, indicating a pronounced right skew. Households and social partners follow, whereas economists exhibit no significant change.

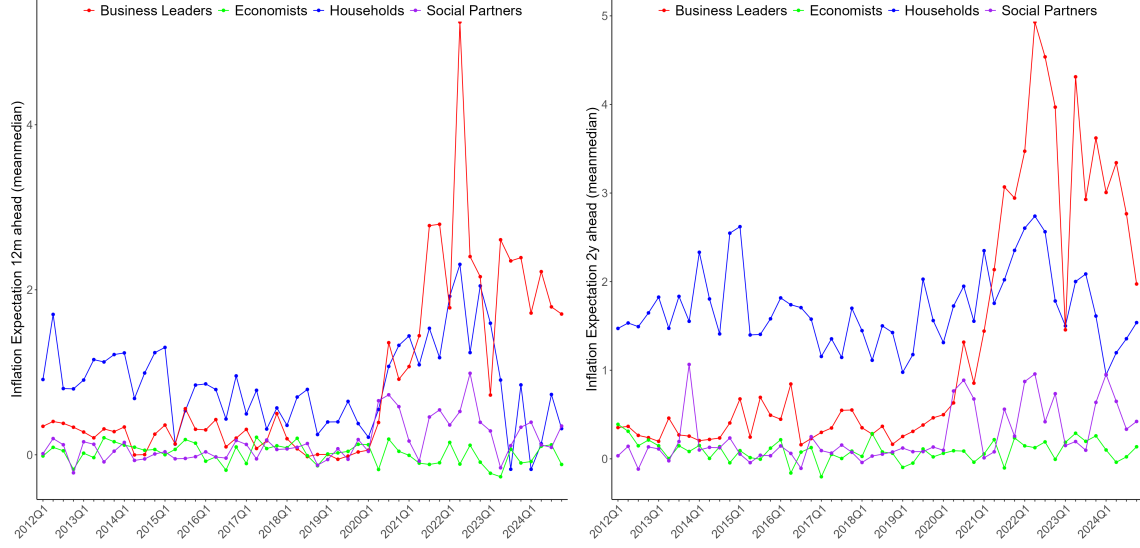


Figure 3: Timeseries of difference between mean and median inflation expectations since 2012

Note: The left hand side plots short-term expectations (over the next 12 months) and the right hand side plots medium-term expectations (over the next 2 years).

Compared to the other agents, both economists and social partners exhibit a mild and similar increase in dispersion during the post-pandemic inflation surge. The feature that sets them apart is skewness. While economists observe an increase in dispersion and no change in skewness, social partners' distribution of inflation expectations becomes wider and more right-skewed after 2020, suggesting the share of respondents who predicted high inflation increased somewhat more among social partners than among economists.

Similarly to the evidence on the level of inflation expectations, we observe a ranking in terms of skewness and dispersion among the inflation expectation of different groups of agents. During the sample period of low inflation, households exhibit the highest dispersion in inflation expectations, followed by firms, economists and social partners. Households also display substantial right skewness. Firms do as well but to a lesser extent. The rankings substantially change after the pandemic. Firms' inflation expectations exhibit the highest degree of skewness and uncertainty at the two-year horizon, followed by households.

3.3 Term Structure

A central issue for central banks is the degree to which inflation expectations are anchored, which measures trust in the institution and helps the bank achieve its target. The inflation target of central banks is typically defined as a inflation number that the central bank aims to achieve over the intermediate horizon. Hence, one way to test whether inflation expectations are anchored is to test whether longer-term inflation expectations are centered at the inflation target of the central bank (level anchoring). Complementary, if inflation expectations are well anchored, it should be the case that short term inflation expectations can fluctuate due to shocks hitting the economy but agents' should understand that the central bank will take the appropriate actions to bring inflation back to target so that variation in longer term inflation expectations should be unresponsive to variation in short-term expectations (sensitivity anchoring) (Weber et al. 2022, D'Acunto et al. 2024).

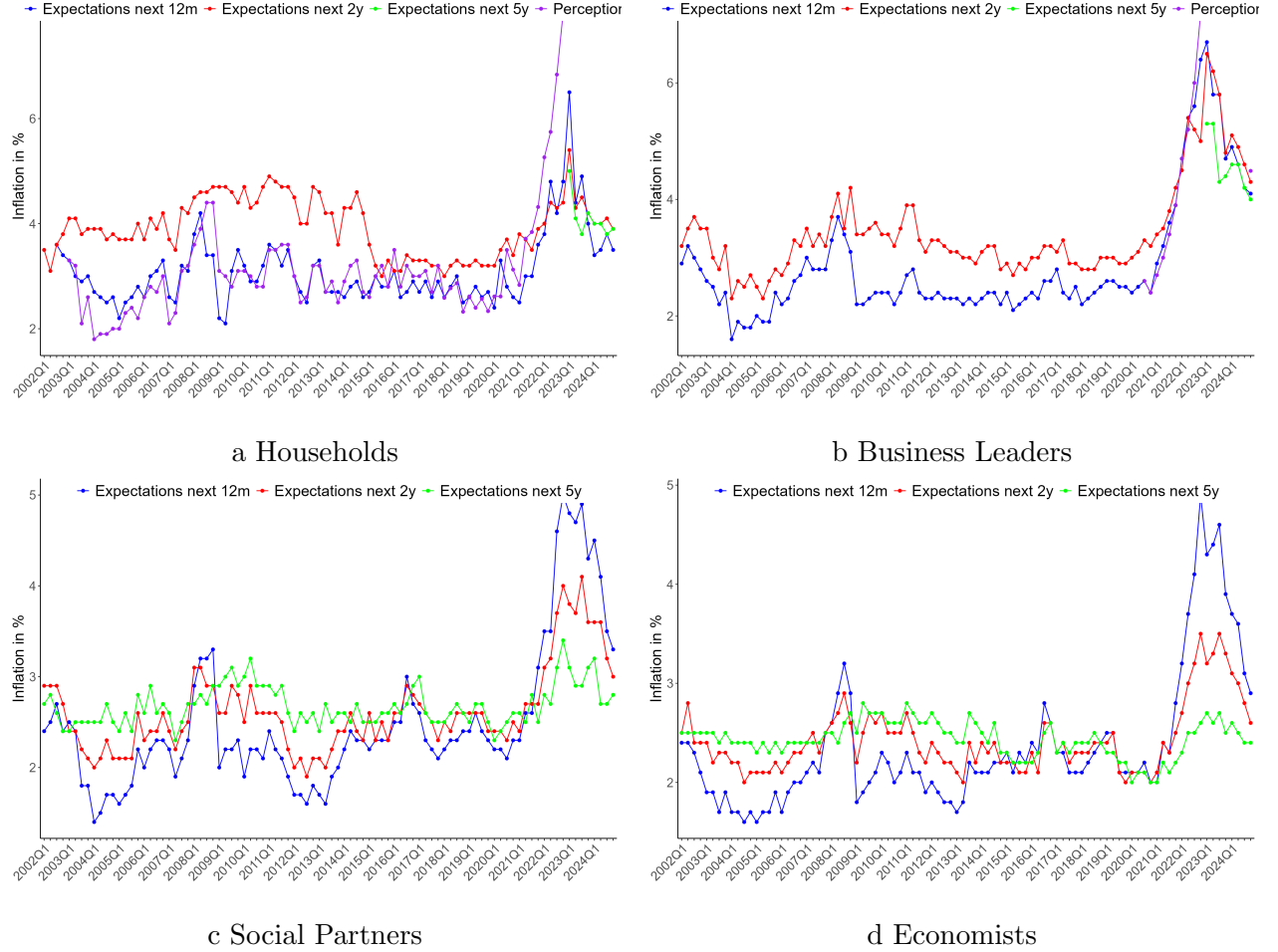


Figure 4: Time Series of Term Structure

Figure 4 plots the inflation expectations of all four types of agents across different forecasting horizons. For the pre-pandemic sample, we find for both households and firms medium-term inflation expectations are typically higher than 12-month-ahead expectations (or inflation perceptions for households), thus exhibiting an upward sloping term structure. For households, the result of an upward sloping term structure of inflation expectations resembles the findings from the New York Fed SCE (Armantier et al. 2013). The pass-through from inflation perceptions to short-term expectations is very high before the pandemic, but it declines substantially afterwards, when perceptions greatly exceed one-year ahead expectations. For all agents, the term structure of expectations shifts from sloping upward to downward after the pandemic. In general, for all groups the longer the forecast horizon, the less volatile the inflation expectation.

As we observed in the previous two sections, social partners behave very similarly to economists. However, a notable difference lies in their long-term inflation expectation. While economists lowered their long-term forecasts following the announcement in March 2018 of the central bank to lower the inflation target from 2.5% to 2%, social partners did not revise their forecasts downward. This divergence might have had significant implications for wage-setting processes, which are managed by social partners in Norway.

We next aim to understand how these aggregate results are related to the pass-through at the individual forecaster level, by estimating the degree to which short-term expectations drive long-term inflation expectations. Repeating the analysis in Jonung (1981) for households and Candia, Weber, Gorodnichenko & Coibion (2023) for firms we show that this pattern is also present in Norway.

We compare a term structure regression for households, firms, economists and social partners:

$$\mathbf{E}_{i,t}\pi_{t+8} = \alpha + \beta_1\mathbf{E}_{i,t}\pi_{t+4} + \beta_2\pi_t + \gamma X_i + \epsilon_{i,t} \quad (1)$$

where $\mathbf{E}_{i,t}\pi_{t+k}$ denotes the expectations of agent i of inflation over the next k periods elicited at time t , π_t denotes the realized value of inflation at time t over the previous 12 months and X_i is a vector of control variables. Table 4 summarizes the pass-through of both realized inflation and short-term inflation expectations into medium-term expectations for households, business leaders, economists, and social partners, as estimated by regression (1). Panel A shows the results for the period of low and stable inflation and panel B for the post-pandemic inflation period.¹⁴ For all groups, short-term inflation expectations significantly influence medium-term forecasts. In the period of low and stable inflation, the pass-through from one-year-ahead to two-year-ahead expectations is lowest for households (0.66), followed by

¹⁴The full set of controls is shown in Tables B.4 and B.5 in the Appendix.

Table 4: Term structure at the individual level

	$E_{i,t}\pi_{t+8}$			
	Households	Business Leaders	Economists	Social Partners
Panel A: 2012 Q1 - 2021 Q2				
$E_{i,t}\pi_{t+4}$	0.664*** (0.007)	0.822*** (0.007)	0.680*** (0.018)	1.310*** (0.025)
Controls	Yes	Yes	Yes	Yes
Observations	27,807	15,922	1,969	1,232
R ²	0.282	0.469	0.473	0.698
Panel B: 2021 Q3 - 2024 Q4				
$E_{i,t}\pi_{t+4}$	0.443*** (0.008)	0.941*** (0.008)	0.550*** (0.020)	1.176*** (0.028)
Controls	Yes	Yes	Yes	Yes
Observations	10,353	6,481	603	489
R ²	0.246	0.686	0.655	0.786

*p<0.1; **p<0.05; ***p<0.01

Note: Regression from model (1) for households, business leaders, economists and social partners. All models include individual level controls. For households, controls include age, sex and occupational status; for business leaders sector and size; for economists a dummy for employment at financial institution and for social partners a dummy for employer organizations.

economists (0.68) and firms (0.82), and is highest for social partners (1.3), where the coefficient even exceeds one. In the high-inflation period, the pass-through coefficient decreases for households (0.44), economists (0.55), and social partners (1.17), whereas it increases slightly for business leaders (0.94).

These findings indicate that, although medium-term forecasts are less volatile than short-term ones, they respond substantially to changes in short-term expectations. Since short-term expectations are strongly shaped by perceptions (Huber et al. 2023), which themselves are influenced by recent inflation outcomes, our results suggest that agents perceive, on average, inflation shocks as relatively persistent. The decline in the pass-through for most groups during the high-inflation period may reflect stronger expectations of mean reversion. This pattern, in turn, could indicate a lower risk of de-anchoring, even amid elevated inflation. In contrast, firms appear to view inflation as more persistent when inflation is high, possibly reflecting concerns over cost pressures and pricing dynamics.

3.4 Passthrough of Inflation Expectations to Wage Expectations

In addition to inflation expectations, the NBES surveys include questions on wage growth expectations for all agents, allowing us to study the wage-inflation passthrough in expectations. Households are asked about their personal wage growth over the past 12 months and their expected personal wage growth over the next 12 months. For firms, experts, and social

partners, the survey focuses on expected wage growth for the current and next year. Firms are specifically asked about wage growth in their own business, whereas the other two groups are asked about expected aggregate wage growth.

Social partners significantly affect actual wage growth, as they set the wage norm for each sector, which in turn forms the basis for individual wage negotiations. This role of social partners in shaping actual wage growth reflects the broader institutional framework of wage setting in Norway. While wage negotiations are formally decentralized, they are coordinated through the so-called *frontfagsmodellen*, where the manufacturing sector negotiates first and sets a wage norm that guides settlements in other sectors. The rationale for this model is that the wage settlements should ensure competitiveness of the trading sector, i.e. manufacturing industries exposed to international market competitions. This coordination gives social partners an important influence in anchoring wage growth across the economy, making their expectations especially informative. In terms of collective bargaining coverage, Norway reaches about 70%, which places it broadly in line with many European countries.¹⁵ Unlike many other European countries, Norway achieves this coverage primarily through voluntary coordination rather than legal extension of agreements. Thus, while the Norwegian model is distinctive in its reliance on a negotiated wage norm and voluntary diffusion, it is not an outlier in terms of overall bargaining coverage. This institutional context helps explain why wage expectations, particularly those of social partners and firms, are closely linked to actual wage outcomes, and why they provide a valuable perspective on the wage-inflation pass-through.

We start by plotting the time-series of nominal wage growth and inflation expectations over a 12-month horizon in Figure 5.¹⁶ For the period 2002-2008, all agents expected nominal wage growth to exceed inflation. After the Great Financial Crisis, households' wage growth expectations fell substantially and remained below inflation expectations. In contrast, firms, social partners and experts continued to expect higher wage growth than inflation until the Covid-19 pandemic in 2020. Since then, firms, like households, expect a decrease in real wages, whereas social partners and experts expect wage growth and inflation to move more closely together. Hence, the expected wage-inflation pass-through is substantially different across agents, not constant and depends on economic circumstances. Previous literature has focused heavily on the post-2020 period (Hajdini et al. 2023, Savignac et al. 2024, Ab-

¹⁵The coverage is somewhat lower than in the other Nordic countries (Sweden, Denmark, and Finland) where coverage typically exceeds 85%, but it is similar to or slightly below levels in Italy, France, Spain, and the Netherlands (ranging from 75–90%), and higher than in Germany, where coverage is closer to 45%.

¹⁶For firms, social partners and experts we have forecasts for the current year and next year. To compute a projection over 12 months, we weigh both forecasts according to the current quarter.

berger et al. 2024, Baumann et al. 2024, Buchheim et al. 2024). The time-varying expected pass-through has possibly important implications for price-wage spirals.

To analyze how wage expectations are determined by expected inflation more rigorously, we follow Jain et al. (2024) and estimate the following regression:

$$\mathbf{E}_{i,t}w_{i,t+4} = \alpha_0 + \beta_1\mathbf{E}_{i,t}w_{i,t} + \beta_2\mathbf{E}_{i,t}\pi_{t+4} + \gamma X_i + \epsilon_{i,t}, \quad (2)$$

where $\mathbf{E}_{i,t}w_{i,t+k}$ is agent i 's survey response for the expectation about (personal) wage growth rate over the next k periods. Inflation expectations are defined as before. On the right hand side, $\mathbf{E}_{i,t}w_{i,t}$ is agent i 's perceived (personal) wage growth over the past 4 quarters (capturing persistence in wage growth expectations). Because we only observe perceived wages for households, we set it equal to the actual nominal wage growth in Norway in the previous quarter for business leaders, social partners and economists. We only use the first quarter of each year in the regression, such that for business leaders, social partners and economists, current year expectations match the 12 month horizon of households.

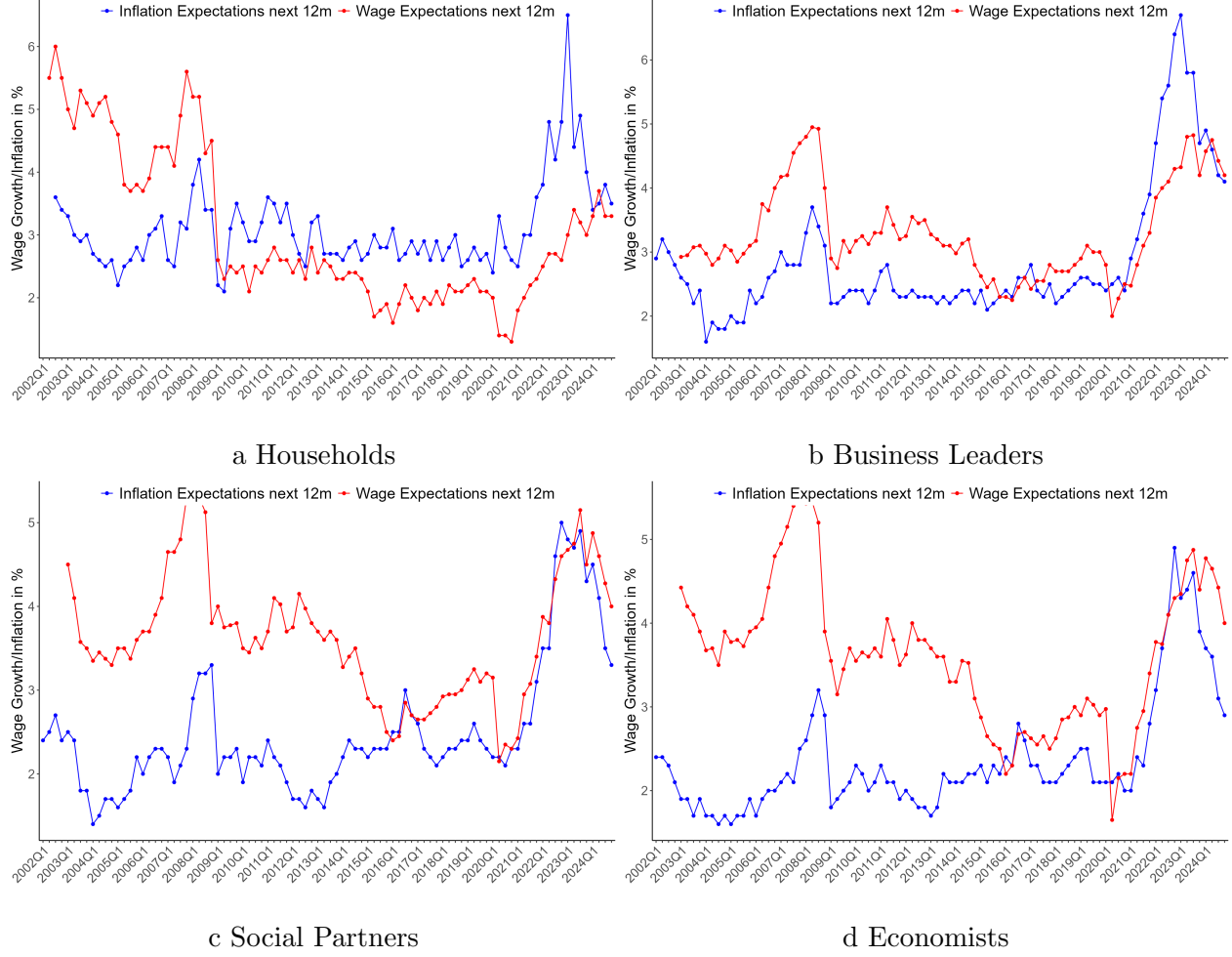


Figure 5: Timeseries of Wage and Inflation Expectations (12m ahead)

Note: For firms, unions and experts the 12 months ahead forecast is computed as a weighted average of current year and next year forecast where the weights are determined by the current quarter. Firms and households forecast individual wage growth, unions and experts wage growth in the aggregate economy.

Furthermore, unions bargain at the beginning of the year such that the first quarter indicates average wage growth for the economy. We include the same set of controls as for the term structure regression.

Table 5: Inflation-Wage expectations passthrough

	$E_{i,t}w_{i,t+4}$			
	Households	Business Leaders	Economists	Social Partners
Panel A: 2012 Q1 - 2021 Q1				
$E_{i,t}\pi_{t+4}$	0.084*** (0.031)	0.150*** (0.009)	0.164*** (0.048)	0.107** (0.055)
$E_{i,t}w_{i,t}$	0.164*** (0.013)			
w_{t-1}		0.275*** (0.036)	0.298*** (0.049)	0.170*** (0.047)
Controls	Yes	Yes	Yes	Yes
Observations	3,337	4,449	527	343
R ²	0.065	0.094	0.349	0.383
Panel B: 2022 Q1 - 2024 Q1				
$E_{i,t}\pi_{t+4}$	0.091*** (0.032)	0.715*** (0.018)	0.238*** (0.064)	0.059 (0.043)
$E_{i,t}w_{i,t}$	0.040* (0.020)			
w_{t-1}		0.780*** (0.160)	0.509*** (0.080)	0.519*** (0.114)
Controls	Yes	Yes	Yes	Yes
Observations	1,534	1,418	132	108
R ²	0.034	0.538	0.341	0.275

*p<0.1; **p<0.05; ***p<0.01

Note: Regression from model (2) for households, business leaders, economists and social partners. All models include individual level controls. For households, controls include age, sex and occupational status; for business leaders sector and size; for economists a dummy for employment at financial institution and for social partners a dummy for employer organizations. We only use observations in the first quarter to ensure aligned forecasting horizons.

Table 5 reports the results. For tractability, we only report the coefficients related to inflation expectations and nominal wages (perceptions/lagged wages) only, but the full set of controls is included in Tables B.6 and B.7 in the Appendix. We observe a positive and significant passthrough of inflation to wage expectations for all agents. The magnitude is substantially different between agents and over a period of low inflation (2012Q1-2021Q2) versus high inflation (2021Q3-2024Q4). In the pre-pandemic sample, we observe that economists exhibit the highest pass through (0.16), followed by business leaders (0.15) and social part-

ners (0.11). After the inflation surge, the passthrough is substantially higher for business leaders (0.715) and economists (0.24), smaller for social partners (0.06), and only marginally higher for households (0.09), who have the lowest passthrough of all agents. Overall, despite this heterogeneity, the passthrough is incomplete for all agents and both sub-samples. We compute a similar regression as 2 using actual data, to estimate the effective pass-through from inflation to wages. We estimate the coefficient associated with lagged wage growth to be about 0.7 and the one associated with either contemporaneous (or lagged) inflation about 0.17 (0.12) and non statistically significant.

Several recent studies have estimated the pass-through of inflation expectations to households' and firms' wage expectations, mostly using randomized controlled trials during the high inflation period. Our estimated pass-through for households is in line with the findings in the literature, which range between 0 and 0.2 (Jain et al. (2024), Buchheim et al. (2024), Hajdini et al. (2023)). We also confirm that the pass-through is somewhat higher in periods of high inflation, as shown in Jain et al. (2024). Our estimated pass-through for firms in the pre-inflation surge is comparable to Coibion et al. (2018) and Savignac et al. (2024), which find a limited pass-through, with point estimates between 0.1 and 0.3. Studies using survey data from the most recent high inflation episode confirm the estimates of studies conducted during low inflation Baumann et al. (2024), Abberger et al. (2024), Buchheim et al. (2024). In the 2021-2024 sub-sample our estimated pass-through is much higher than what is reported in those studies, but comparable to Akarsu et al. (2024) which looks at Turkish firms in a high inflation environment.

3.5 The Pass-Through of Electricity Prices

In 2022, the Norwegian economy, like most European countries, experienced a shock in electricity prices. However, what set Norway apart was that this shock was confined to the southern regions (Vestlandet, Østlandet, Sørlandet, Oslo), leaving the northern regions (Nord Norge and Midt Norge) largely unaffected. The high prices in the South of Norway were exogenous to domestic economic conditions and driven by both supply and demand factors. On the demand side, high electricity prices in Norway reflected very high electricity prices in Europe due to the energy crisis, coupled with high gas and coal prices. On the supply side, record low levels of water reservoirs in southern Norway throughout most of the year restricted hydroelectric production. Given that 96% of Norway's electricity supply is hydro-based and that transmission capacity between the northern and southern regions is severely limited due to insufficient infrastructure, the supply shortages in the south put significant upward pressure on electricity prices. As a result, electricity prices in Norway began diverging sharply between the two regions starting in 2021Q2. Before then, prices

across the two regions were virtually identical, as we show in Figure C.3. However, only firms experienced the divergence in electricity prices, as the government put in place a support package for households starting in 2021Q4, so that electricity prices for households living in the south were close to the prices households in the north faced.¹⁷ The regional price divergence creates an ideal framework for evaluating the effects of electricity prices on firms' expectations. By exploiting the geographical granularity of the NBES survey, we study the impact of energy prices on firms' and households' inflation expectations.

We estimate the pass-through of electricity prices to inflation for firms using the following single difference regression in the spirit of Jo & Klopach (2024) and Wehrhofer (2023):

$$\mathbf{E}_{i,r,s,t}\pi_{t+4} = \alpha_0 + \beta D_{r,t} + \gamma_1 X_i + \gamma_2 T_t + \gamma_3 S_i + \epsilon_{i,r,s,t} \quad (3)$$

where $\mathbf{E}_{i,r,s,t}\pi_{t+k}$ denotes firm i 's inflation expectations k periods ahead elicited at time t , residing in part of country r and belonging to sector s , and $D_{r,t}$ is a dummy variable which takes value one during the periods in which the South region experiences higher electricity prices (2021:Q2 until 2024:Q4). The dummy captures the effect of experiencing different energy prices on agents' expectations. We also include industry and size controls for firms and demographic controls for households and quarter-time fixed-effects in T_t , which account for changes in domestic or international macroeconomic conditions, such as monetary policy changes, fiscal policy interventions, shocks to commodity prices or supply chain disruptions as well as a dummy for living in the South to capture constant differentials between two regions.

The empirical specification rests on two key assumptions. The first assumption is that the inflation expectations of firms in the South and North followed parallel trends both before and after the shock to electricity prices if the shock had not occurred. This assumption is inherently untestable but we can check whether the inflation expectations of firms followed parallel trends before the shock in which case our remaining assumption is that absent the shock, the expectations kept following parallel trends. This part of the assumptions seems satisfied in the data, as Figure 6 shows. Mean expectations in the South were the same as in the North before the electricity shock both for households and firms. Second, the change in electricity prices in the South was exogenous to Norwegian macroeconomic conditions. This assumption appears reasonable, because electricity prices increased due

¹⁷Almost the entirety (98%) of electricity price contracts for households are based on spot prices, whereas firms have different shares of fixed contracts based on their sector. The variable price contracts are 94% for services, 87% for manufacturing excluding energy intensive manufacturing and 100% for energy-intensive manufacturing.

to the exogenous supply and demand shocks which we discussed above. The parameter of interest in regression (3) is the coefficient associated with the shock dummy, β , which measures the average difference in inflation expectations between the North and the South due to the electricity price shock, where the average is taken over the observations for which electricity prices diverge. The first column of Table 6 shows the results of this regression for firms' inflation expectations over the next 12 months, whereas the second column reports results over the next two years. A significant positive effect of $D_{r,t}$ on inflation expectations exists. On average, over the quarters during which the electricity prices diverge, that is, from 2021Q2 to 2024Q4, firms in the South expected approximately 1.01 percentage points higher inflation than firms in the North. Interestingly, the effect is significant for short as well as longer term inflation expectations.

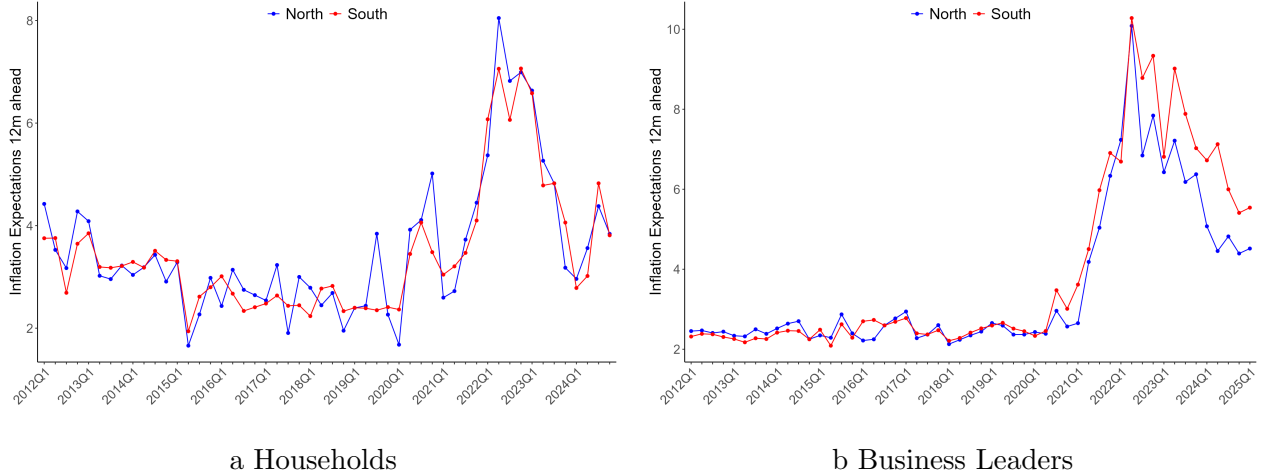


Figure 6: Inflation expectations split by region

Note: In 2022 electricity prices increased strongly in Southern Norway but remained stable in Northern Norway (see Figure C.3 in the Appendix).

Next, we compare the results to households. Figure 6 shows that the inflation expectations of households living in the North are similar to those in the South for the whole sample. To formally verify that no difference in inflation expectations across regions exists for households, we estimate regression (3) for households. Table 6 shows that the divergence in electricity prices did not cause a divergence in inflation expectations, likely due to the fact that households in the South received a support package so that the prices paid by households in the South were very close to the ones paid by households and firms in the North. Table B.8 in the Appendix uses the dummy interacted with the price differential between North and South electricity prices in logs in equation (3). In line with the results of Table 6, we observe a positive and significant effect on inflation expectations of firms, and no significant effect for households.

As a robustness check, we conduct a placebo test using a moving-window approach to assess whether the estimated treatment effects are specific to the actual intervention period. Specifically, we re-estimate our main regression model using placebo treatment dummies defined over all possible 3-year windows across the sample period. In each iteration, we define a placebo dummy variable equal to one for observations in the “South” region during the respective window and zero otherwise. We then regress the outcome on this placebo dummy, along with the full set of controls used in the main specification (3). Appendix Figure C.4 plots the estimated coefficients and their 95% confidence intervals for each window. We assess whether significant effects are detected outside the actual treatment period. The results show no consistent or systematic effects prior to the intervention, supporting the validity of the causal interpretation of our main findings.

Recent papers by [Reis & Patzelt \(2024\)](#) and [Wehrhofer \(2023\)](#) on German households show a significant and positive pass-through from electricity prices to inflation expectations. In our case, we see a generalized increase in inflation expectations when electricity prices increase, however, expectations of households located in the South do not respond differently than those of households located in the North because agents are not exposed to different electricity prices, as instead is the case in the cited studies. Regarding firms, [Wehrhofer \(2023\)](#) finds that they have a positive and significant pass through from electricity prices, but they do not seem to extrapolate from individual prices to inflation for the overall economy. The divergence with respect to our results might be due to the fact that in Germany electricity contracts are usually fixed contracts, whereas in Norway the overwhelming majority is based on spot prices. Therefore, firms in Norway might anticipate that all other firms will be exposed to the same increase in input cost and be forced to raise sales prices, which will ultimately result in a generalized increase in inflation.

4 Conclusion

We document several empirical facts about subjective expectations using the Norges Bank Expectations survey, a representative survey of Norwegian households, business leaders, social partners and economists. Several features make the survey ideal for a cross agent comparison: first, the time span is relatively long compared to alternative surveys in the literature, as it has been running since 2002 at the quarterly frequency. Second, it surveys social partners, who are the key players in the determination of wages. Third, it elicits expectations about inflation and wages at multiple horizons. Fourth, the information sets available to agents when making their forecasts are directly comparable across groups and individuals, as respondents are surveyed in the same period, which does not include monetary policy decisions nor releases

Table 6: Effect of Energy Prices on Inflation Expectations

	Firms		Households	
	$E_{i,r,s,t}\pi_{t+4}$	$E_{i,r,s,t}\pi_{t+8}$	$E_{i,r,s,t}\pi_{t+4}$	$E_{i,r,s,t}\pi_{t+8}$
$D_{r,t}$	1.087*** (0.204)	1.277*** (0.239)	-0.078 (0.160)	-0.088 (0.189)
Time FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Observations	22,590	21,852	42,240	39,626
R ²	0.166	0.129	0.044	0.040

*p<0.1; **p<0.05; ***p<0.01

Note: Regression from model (3) for households, business leaders, economists and social partners. All models include time fixed effects, a dummy for living in the south and individual level controls. For households, controls include age, sex and occupational status; for business leaders sector and size.

of national accounts. Finally, expectations are elicited in homogeneous ways ensuring that different wordings of questions can not drive heterogeneity across agents. These features allow us to study the evolution of expectations for both inflation and wages over the business cycle and in response to large shocks, and to compare it among different agents.

Consistent with other studies, we find that until 2021, households expectations were higher than firms, and economists had the lowest expectations. As a novel result we document that social partners behaved very similarly to economists. However, during the recent inflation surge, firms' expectations rose above those of households. Disagreement about short run inflation has been quite stable until the pandemic, and has risen more markedly for households and firms, but it is reverting to lower values with the decrease in inflation. For longer horizons, disagreement has been decreasing more slowly and firms show higher disagreement than households starting in 2022. Perceptions of inflation for households and firms were closely aligned with inflation expectations but they diverged starting in 2022. Until then, the term structure of expectations was upward sloping for firms and households but it inverted to downward sloping in the most recent sample.

Regarding the relationship between wage and inflation expectations we find that expected future inflation positively affect future wages for all groups, but the magnitude of the pass-through changed during the recent inflation surge: for social partners it declined, for firms and economists it increased and for households it marginally increased. Finally, we document a significant causal pass-through of electricity prices to short- and medium-term inflation expectations for firms.

Taken together, these facts highlight how different types of agents form their inflation expectations, how the inflation-formation process varies over time, and how inflation expectations have the potential to trigger wage-price spirals and jointly inform new theories of expectations formation.

References

- Abberger, K., Kathrin, F. A., Michael, L., Sarah, L. & Siegrist, S. (2024), The Pass-Through of Inflation Expectations into Prices and Wages: Evidence from an RCT Survey.
- Akarsu, O., Aktuğ, E. & Huzeyfe, T. (2024), Inflation Expectations and Firms' Decisions in High Inflation: Evidence from a Randomized Control Trial.
- Andrade, P., Coibion, O., Gautier, E. & Gorodnichenko, Y. (2020), No Firm Is an Island? How Industry Conditions Shape Firms' Expectations.
- Andre, P., Pizzinelli, C., Roth, C. & Wohlfart, J. (2022), 'Subjective Models of the Macroeconomy: Evidence From Experts and Representative Samples', *Review of Economic Studies* **89**(6), 2958–2991.
- Armantier, O., Bruine De Bruin, W., Potter, S., Topa, G., Van Der Klaauw, W. & Zafar, B. (2013), 'Measuring inflation expectations'.
- Bachmann, R., Berg, T. O. & Sims, E. R. (2015), 'Inflation Expectations and Readiness to Spend: Cross-Sectional Evidence', *American Economic Journal: Economic Policy* **7**(1), 1–35.
- Bachmann, R., Topa, G. & van der Klaauw, W., eds (2023), *Handbook of Economic Expectations*, Elsevier.
- Baumann, U., Ferrando, A., Georgarakos, D., Gorodnichenko, Y. & Reinelt, T. (2024), SAFE to update inflation expectations? New survey evidence on euro area firms.
- Becker, C., Duersch, P. & Eife, T. A. (2023), Measuring inflation expectations: How the response scale shapes density forecasts, Technical report, AWI Discussion Paper Series.
- Binder, C. C. (2018), 'Inflation expectations and the price at the pump', *Journal of Macroeconomics* **58**, 1–18.
- Bracha, A. & Tang, J. (2024), 'Inflation levels and (in)attention', *Review of Economic Studies* .

- Bracha, A. & Tang, J. (2025), ‘Inflation levels and (in) attention’, *Review of Economic Studies* **92**(3), 1564–1594.
- Bruine De Bruin, W., Van der Klaauw, W., Downs, J. S., Fischhoff, B., Topa, G., Armantier, O., Chien, S., Colvin, T., Forman, D., Fielding, P., Greenwald, D., Gutsche, T., Holbrook, M. & Weerman, B. (2010), ‘Expectations of Inflation: The Role of Demographic Variables, Expectation Formation, and Financial Literacy’, *Journal of Consumer Affairs* **44**(2), 381–402.
- Bruine de Bruin, W., van der Klaauw, W., van Rooij, M., Teppa, F. & de Vos, K. (2017), ‘Measuring expectations of inflation: Effects of survey mode, wording, and opportunities to revise’, *Journal of Economic Psychology* **59**, 45–58.
- Bryan, M. & Venkatu, G. (2001), ‘The Demographics of Inflation Opinion Surveys’, *Federal Reserve Bank of Cleveland Commentary* **1015**.
- Buchheim, L., Link, S. & Möhrle, S. (2024), Inflation and Wage Expectations of Firms and Employees .
- Candia, B., Coibion, O. & Gorodnichenko, Y. (2023), The Macroeconomic Expectations of Firms, *in* R. Bachmann, G. Topa & W. van der Klaauw, eds, ‘Handbook of Economics Expectations’, Elsevier, chapter 11, pp. 321–353.
- Candia, B., Weber, M., Gorodnichenko, Y. & Coibion, O. (2023), ‘Perceived and Expected Rates of Inflation of US Firms’, *AEA Papers and Proceedings* **113**, 52–55.
- Cavallo, A., Cruces, G. & Perez-Truglia, R. (2017), ‘Inflation expectations, learning, and supermarket prices: Evidence from survey experiments’, *American Economic Journal: Macroeconomics* **9**(3), 1–35.
- Clements, M. P., Rich, R. W. & Tracy, J. S. (2023), Surveys of Professionals, *in* R. Bachmann, G. Topa & W. van der Klaauw, eds, ‘Handbook of Economics Expectations’, Elsevier, chapter 3, pp. 71–106.
- Coibion, O., Georgarakos, D., Gorodnichenko, Y. & Weber, M. (2023), ‘Forward Guidance and Household Expectations’, *Journal of the European Economic Association* **21**(5), 2131–2171.
- Coibion, O. & Gorodnichenko, Y. (2015), ‘Is The Phillips Curve Alive and Well After All? Inflation Expectations and the Missing Disinflation’, *American Economic Journal: Macroeconomics* **1**(7), 197–232.

- Coibion, O., Gorodnichenko, Y. & Kumar, S. (2018), ‘How Do Firms Form Their Expectations? New Survey Evidence’, *American Economic Review* **108**(9), 2671–2713.
- Coibion, O., Gorodnichenko, Y., Kumar, S. & Pedemonte, M. (2020), ‘Inflation expectations as a policy tool?’, *Journal of International Economics* **124**, 103297.
- Coibion, O., Gorodnichenko, Y. & Weber, M. (2022), ‘Monetary Policy Communications and their Effects on Household Inflation Expectations’, *Journal of Political Economy* **130**(6), 1537–1584.
- D’Acunto, F., Malmendier, U., Ospina, J. & Weber, M. (2021), ‘Exposure to grocery prices and inflation expectations’, *Journal of Political Economy* **129**, 1615–1639.
URL: <http://dx.doi.org/10.1086/713192>
- D’Acunto, F., Malmendier, U. & Weber, M. (2021), ‘Gender Roles produce divergent economic expectations’, *Proceedings of the National Academy of Science* **118**(21).
- D’Acunto, F., Malmendier, U. & Weber, M. (2023), What Do the Data Tell Us About Inflation Expectations?, in R. Bachmann, G. Topa & W. van der Klaauw, eds, ‘Handbook of Economics Expectations’, Elsevier, chapter 5, pp. 133–161.
- de Bruin, W. B., Van der Klaauw, W. & Topa, G. (2011), ‘Expectations of inflation: The biasing effect of thoughts about specific prices’, *Journal of Economic Psychology* **32**(5), 834–845.
- D’Acunto, F., Charalambakis, E., Georgarakos, D., Kenny, G., Meyer, J. & Weber, M. (2024), ‘Household inflation expectations: An overview of recent insights for monetary policy’.
- D’Acunto, F., Hoang, D. & Weber, M. (2022), ‘Managing households’ expectations with unconventional policies’, *The Review of Financial Studies* **35**(4), 1597–1642.
- D’Acunto, F. & Weber, M. (2024), Why Survey-Based Subjective Expectations are Meaningful and Important, Technical report, National Bureau of Economic Research, Cambridge, MA.
- Fofana, S., Patzelt, P. & Reis, R. (2024), Household disagreement about expected inflation.
- Hajdini, I., Knotek, E. S., Leer, J., Pedemonte, M., Rich, R. & Schoenle, R. (2023), Low Passthrough from Inflation Expectations to Income Growth Expectations: Why People Dislike Inflation.

- Huber, S. J., Minina, D. & Schmidt, T. (2023), The pass-through from inflation perceptions to inflation expectations.
- Jain, M., Kostyshyna, O. & Zhang, X. (2024), ‘How do people view wage and price inflation?’, *Journal of Monetary Economics* .
- Jo, Y. J. & Klopach, B. (2024), Fueling Expectations: The Causal Impact of Gas Prices on Inflation Expectations and Consumption .
- Jonung, L. (1981), ‘Perceived and Expected Rates of Inflation in Sweden’.
- Kilian, L. & Zhou, X. (2022), ‘Oil prices, gasoline prices, and inflation expectations’, *Journal of Applied Econometrics* **37**, 867–881.
- Korenok, O., Munro, D. & Chen, J. (2023a), ‘Inflation and attention thresholds’, *Review of Economics and Statistics* pp. 1–28.
- Korenok, O., Munro, D. & Chen, J. (2023b), ‘Inflation and attention thresholds’, *Review of Economics and Statistics* pp. 1–28.
- Malmendier, U. & Nagel, S. (2016), ‘Learning from Inflation Experiences’, *The Quarterly Journal of Economics* **131**(1), 53–87.
- Mankiw, G., Reis, R. & Wolfers, J. (2004), *Disagreement about Inflation Expectations*, Vol. 18, The MIT Press, pp. 209–270.
- Pfäuti, O. (2023), ‘The inflation attention threshold and inflation surges’, *arXiv preprint arXiv:2308.09480* p. 2.
- Pfäuti, O. (2023), The inflation attention threshold and inflation surges.
- Piccolo, J., Russo, A., Granziera, E. & Castelnuovo, E. (2025), Households’ Macroeconomic Beliefs: The Role of Education.
- Reiche, L. (2025), Beyond Groceries: Forecast Confidence and the Gender Gap in Inflation Expectations.
- Reis, R. (2021), Losing the inflation anchor.
- Reis, R. & Patzelt, P. (2024), Estimating the Rise in Expected Inflation from Higher Energy Prices .
- Ropele, T., Gorodnichenko, Y. & Coibion, O. (2022), Inflation expectations and corporate

- borrowing decisions: New causal evidence, Technical report, National Bureau of Economic Research.
- Savignac, F., Gautier, E., Gorodnichenko, Y. & Coibion, O. (2024), ‘Firms’ Inflation Expectations: New Evidence from France’, *Journal of the European Economic Association* **22**(6), 2748–2781.
- Stantcheva, S. (2024), Why do we dislike inflation.
- Weber, M., Candia, B., Afrouzi, H., Ropele, T., Lluberas, R., Frache, S., Meyer, B., Kumar, S., Gorodnichenko, Y., Georgarakos, D., Coibion, O., Kenny, G. & Ponce, J. (2025), ‘Tell me something i don’t already know: Learning in low- and high-inflation settings’, *Econometrica* **93**, 229–264.
- Weber, M., D’Acunto, F., Gorodnichenko, Y. & Coibion, O. (2022), ‘The Subjective Inflation Expectations of Households and Firms: Measurement, Determinants, and Implications’, *Journal of Economic Perspectives* **36**(3), 157–184.
- Wehrhofer, N. (2023), Energy Prices and Inflation Expectations: Evidence from Households and Firms.

A Survey Questionnaire

Survey questions for inflation and wage expectations for households (hh), firms (bl), social partners (sp) and economists (ec).

Perceptions

- [hh] Compared to 12 months ago, do you think the prices of goods and services, as measured by the consumer price index, are higher, about the same or lower now?
- [hh] Approximately how much do you think prices have changed in percentage terms? (average)
- [bl] What do you think the general rise in prices for goods and services has been the last 12 months, as measured by the 12-month change in the consumer price index (CPI)?

Expectations

- [hh] Do you think that the prices of goods and services, as measured by the consumer price index, will be higher, unchanged or lower than today over the next 12 months?
- [hh] Approximately how much higher/lower, measured in percentage?
- [bl, sp, ec] What do you think the general rise in prices for goods and services will be in 12 months, as measured by the 12-month change in the consumer price index (CPI)?
- [hh] How much do you think the prices of goods and services, measured by the consumer price index, will increase annually in 2-3 years, measured in percentage?
- [bl, sp, ec] What do you think the general rise in prices for goods and services will be in two years, as measured by the 12-month change in the consumer price index (CPI)?
- [hh, bl, sp, ec] What do you think the general price increase on goods and services is in 5 years, as measured by the 12-month change in the consumer price index (CPI)?

Purchasing/Sale Prices

- [bl] Do you expect that over the next 12 months your business's purchase prices will increase more than, increase at approximately the same pace as or increase less than in the past 12-month period?
- [bl] Do you expect that over the next 12 months your business's selling prices will increase more than, increase at approximately the same pace as or increase less than in the past 12-month period?

Wages

- [hh] Compared with 12 months ago, by how much do you think your wages or pension has changed in percent?
- [bl] What do you expect the annual wage growth in your company will be this current year?
- [sp, ec] What do you think the average yearly growth in wages will be this current year?
- [hh] By approximately how much do you think your wages or pension will change in percent over the next 12 months? - [bl] What do you expect the average annual wage growth in your company will be next year?
- [sp, ec] What do you think the average yearly growth in wages will be next year?

B Tables

Table B.1: Accuracy of Wage Forecasts

	<i>households</i>	<i>business leaders</i>	<i>social partners</i>	<i>economists</i>
2002Q1-2021Q2				
<i>current</i>	1.19	0.58	0.42	0.45
<i>year</i>	2.67***	1.29***	0.94**	
<i>next</i>	1.09	0.61	0.60	0.59
<i>year</i>	1.84***	1.02	1.02	
2021Q3-2024Q4				
<i>current</i>	1.73	0.62	0.48	0.47
<i>year</i>	3.71	1.32	1.03	
<i>next</i>	2.38	1.19	1.13	1.28
<i>year</i>	1.87	0.94	0.88	

Note: RMSFE for inflation expectations, computed only for observations where expectations of all agents are available. Households report perceptions over the past twelve months (cy) and expectations over the next twelve month (ny) of their own wage. Business leaders, social partners and economists are asked about fixed date forecasts: current year or next year wage. Business leaders are asked about their own wage bills, while social partners and economists are asked about aggregate wages.

Group	2002 Q1 - 2021 Q2			2021 Q3 - 2024 Q4		
	Mean	SD	Observations	Mean	SD	Observations
All	3.16	NA	38604	4.43	NA	14070
Age						
< 35 years	6.04	15.68	8906	7.07	16.03	4181
35 to 54 years	3.07	7.34	13118	4.01	7.12	4728
55 to 64 years	2.29	6.14	6517	3.47	6.85	2234
≥ 65 years	1.58	3.94	10063	2.37	4.43	2927
Sex						
Man	3.59	10.07	20352	4.76	10.39	8817
Woman	2.66	7.91	18252	3.85	9.82	5253
Labor force						
Public sector	2.68	6.05	9698	3.46	6.83	3016
Private sector	3.67	9.15	13047	4.88	9.35	6236
Retired	1.6	3.81	10783	2.37	3.68	3285
Unemployed	7.18	20.4	614	17	32.24	179
Student	8.21	20.97	3271	9.7	22.37	1227
Region						
Nord Norge	3.04	8.95	3676	4.27	11.11	1289
Midt Norge	3.04	8.92	5360	4.5	10.18	2014
Østlandet	3.12	8.95	13966	4.01	8.81	4457
Vestlandet	3.13	8.87	8078	4.68	11.24	2925
Sørlandet	3.04	8.75	2308	4.04	8.04	857
Oslo	3.59	10.57	5216	5.05	11.29	2528

Table B.2: Summary statistics of wage perceptions and expectations by household group

Group	2002 Q1 - 2021 Q2			2021 Q3 - 2024 Q4		
	Mean	SD	Observations	Mean	SD	Observations
All	3.05	3	22319	5.45	8.3	7687
Number of employees						
Less than 50	3.04	2.77	10675	5.01	6.83	2752
Greater than 50	3.05	3.25	9989	5.7	9.02	4934
Sector						
Manufacturing	2.97	2.98	4995	6.09	10.11	1644
Retail and trade	3	2.88	4513	4.95	7.24	1587
Building and construction	3.18	3.45	3311	5.48	7.8	1312
Services	3.07	2.88	9466	5.35	7.92	3147
Price Expectations						
↑ Sales	3.3	4.11	3019	6.55	9.86	2320
↓ or = Sales	3	2.74	19301	4.98	7.5	5367
↑ Purchasing	3.09	3.67	3878	6.51	10.52	2951
↓ or = Purchasing	3.04	2.8	18442	4.81	6.54	4736
Region						
Nord Norge	3.01	2.9	9865	4.87	6.8	493
Midt Norge	2.89	2.61	10687	4.81	6.11	1046
Østlandet	3.01	3.18	13006	5.14	7.43	2513
Vestlandet	2.97	4.39	11834	4.85	5.27	1399
Sørlandet	2.97	3.11	9965	6.97	13.34	317
Oslo	3.04	3.75	11772	6.52	10.93	1919

Table B.3: Summary statistics of own wage expectations next year by firm group

Table B.4: Term Structure on the Individual Level - 2012 Q1 - 2021 Q2

	$\mathbf{E}_{i,t}\pi_{i,t+8}$			
	Households	Business Leaders	Economists	Social Partners
π_t	-0.252*** (0.041)	0.019 (0.027)	-0.058*** (0.013)	-0.163*** (0.029)
$\mathbf{E}_{i,t}\pi_{i,t+4}$	0.664*** (0.007)	0.821*** (0.007)	0.680*** (0.018)	1.310*** (0.025)
Female	0.694*** (0.073)			
Age	-0.013*** (0.002)			
Private sector	-2.999*** (0.834)			
Public sector	-2.895*** (0.835)			
Retired	-2.484*** (0.836)			
Self-employed	-1.853** (0.876)			
Stay-at-home	-1.027 (0.900)			
Student	-0.811 (0.842)			
Unanswered	0.635 (1.268)			
Unemployed	-1.750** (0.881)			
Manufacturing		-0.210*** (0.076)		
Retail trade		-0.097 (0.080)		
Services		-0.292*** (0.069)		
Size		-0.124*** (0.048)		
Financial institutions			-0.232*** (0.024)	
Employer organizations				0.069 (0.049)
Constant	6.519*** (0.840)	1.411*** (0.086)	0.992*** (0.044)	-0.158* (0.082)
Observations	27,807	15,922	1,969	1,232
R ²	0.282	0.469	0.473	0.698
Adjusted R ²	0.282	0.469	0.473	0.697
Residual Std. Error	5.823	2.907	0.496	0.854
F Statistic	909.565***	2,343.024***	588.896***	946.818***

Table B.5: Term Structure on the Individual Level - 2021 Q3 - 2024 Q4

	$E_{i,t}\pi_{i,t+8}$			
	Households	Business Leaders	Economists	Social Partners
π_t	0.121*** (0.043)	-0.003 (0.051)	-0.047*** (0.017)	-0.228*** (0.039)
$E_{i,t}\pi_{i,t+4}$	0.443*** (0.008)	0.941*** (0.008)	0.550*** (0.020)	1.176*** (0.028)
Female	0.415*** (0.134)			
Age	-0.050*** (0.005)			
Private sector	-3.528*** (1.188)			
Public sector	-3.250*** (1.192)			
Retired	-1.858 (1.199)			
Stay-at-home	-0.878 (1.561)			
Student	-2.518** (1.210)			
Unanswered	-1.853 (2.401)			
Unemployed	-2.344* (1.320)			
Manufacturing		-0.621*** (0.241)		
Retail trade		-0.582** (0.241)		
Services		-0.682*** (0.213)		
Size		-0.117 (0.156)		
Financial institutions			-0.228*** (0.050)	
Employer organizations				0.294*** (0.109)
Constant	8.090*** (1.222)	1.645*** (0.311)	1.311*** (0.093)	-0.315 (0.201)
Observations	10,353	6,481	603	489
R ²	0.246	0.686	0.655	0.786
Adjusted R ²	0.245	0.686	0.654	0.785
Residual Std. Error	6.266	5.939	0.549	1.208
F Statistic	306.492***	2,362.469***	379.499***	594.173***

*p<0.1; **p<0.05; ***p<0.01

Table B.6: Determinants of Wage Growth Expectations - 2012 Q1 - 2021 Q2

	$\mathbf{E}_{i,t}w_{i,t+4}$			
	Households	Business Leaders	Economists	Social Partners
$\mathbf{E}_{i,t}w_{i,t}$	0.164*** (0.013)			
$\mathbf{E}_{i,t}\pi_{t+4}$	0.084*** (0.031)	0.150*** (0.009)	0.164*** (0.048)	0.107** (0.055)
π_t	-0.122 (0.182)	-0.242*** (0.032)	-0.377*** (0.048)	-0.400*** (0.045)
w_{t-1}		0.275*** (0.036)	0.298*** (0.049)	0.170*** (0.047)
Female	-0.400 (0.271)			
Age	-0.058*** (0.011)			
Public sector	-0.395 (0.273)			
Manufacturing		-0.102 (0.069)		
Retail trade		-0.123* (0.072)		
Services		0.019 (0.062)		
Size		0.008 (0.042)		
Financial institutions			0.155*** (0.059)	
Employer organizations				-0.227*** (0.054)
Constant	5.483*** (0.677)	2.331*** (0.188)	2.368*** (0.260)	3.201*** (0.256)
Observations	3,337	4,449	527	343
R ²	0.065	0.106	0.349	0.383
Adjusted R ²	0.064	0.105	0.345	0.376
Residual Std. Error	7.429	1.378	0.643	0.502
F Statistic	38.871***	75.605***	70.113***	52.428***

*p<0.1; **p<0.05; ***p<0.01

Note: Regression from model (2) for households, business leaders, economists and social partners. All models include individual level controls. For households, controls include age, sex and occupational status; for business leaders sector and size; for economists a dummy for employment at financial institution and for social partners a dummy for employer organizations. We only use observations in the first quarter to ensure aligned forecasting horizons.

Table B.7: Determinants of Wage Growth Expectations - 2021 Q3 - 2024 Q4

	$\mathbf{E}_{i,t}w_{i,t+4}$			
	Households	Business Leaders	Economists	Social Partners
$\mathbf{E}_{i,t}w_{i,t}$	0.040* (0.020)			
$\mathbf{E}_{i,t}\pi_{t+4}$	0.091*** (0.032)	0.715*** (0.018)	0.238*** (0.064)	0.059 (0.043)
π_t	-0.352* (0.185)	-0.505*** (0.102)	-0.051 (0.053)	0.093 (0.069)
w_{t-1}		0.780*** (0.160)	0.509*** (0.080)	0.519*** (0.114)
Female	-0.358 (0.499)			
Age	-0.083*** (0.018)			
Public sector	-1.447*** (0.504)			
Manufacturing		0.561 (0.390)		
Retail trade		0.263 (0.389)		
Services		0.512 (0.342)		
Size		-0.101 (0.253)		
Financial institutions			0.240* (0.138)	
Employer organizations				-0.469*** (0.166)
Constant	9.928*** (1.303)	-0.628 (0.881)	1.493*** (0.419)	1.874*** (0.600)
Observations	1,534	1,418	132	108
R ²	0.034	0.538	0.341	0.275
Adjusted R ²	0.030	0.536	0.320	0.247
Residual Std. Error	8.753	4.493	0.663	0.858
F Statistic	8.827***	234.922***	16.427***	9.784***

*p<0.1; **p<0.05; ***p<0.01

Note: Regression from model (2) for households, business leaders, economists and social partners. All models include individual level controls. For households, controls include age, sex and occupational status; for business leaders sector and size; for economists a dummy for employment at financial institution and for social partners a dummy for employer organizations. We only use observations in the first quarter to ensure aligned forecasting horizons.

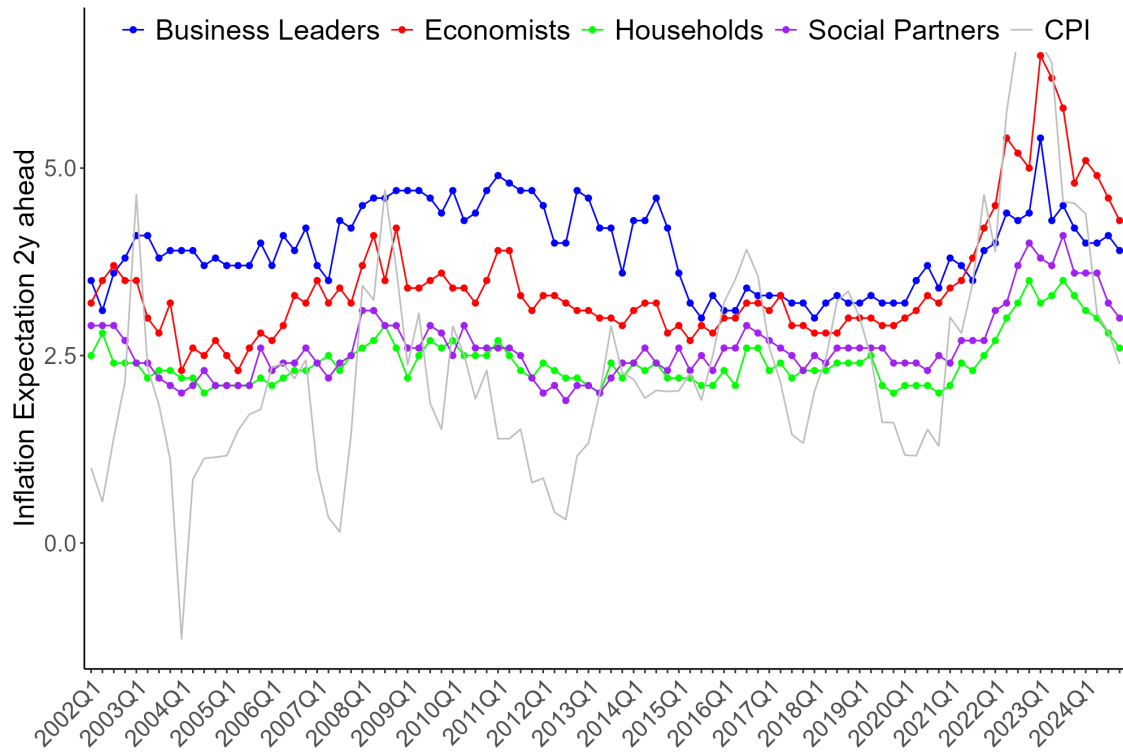
Table B.8: Effect of Energy Prices on Inflation Expectations

	Firms		Households	
	$\mathbf{E}_{i,r,s,t}\pi_{t+4}$	$\mathbf{E}_{i,r,s,t}\pi_{t+8}$	$\mathbf{E}_{i,r,s,t}\pi_{t+4}$	$\mathbf{E}_{i,r,s,t}\pi_{t+8}$
$D_{r,t} \times \Delta P$	0.008*** (0.003)	0.012*** (0.003)	-0.002 (0.002)	-0.001 (0.002)
Time FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Observations	22,590	21,852	42,240	39,626
R ²	0.166	0.128	0.044	0.040

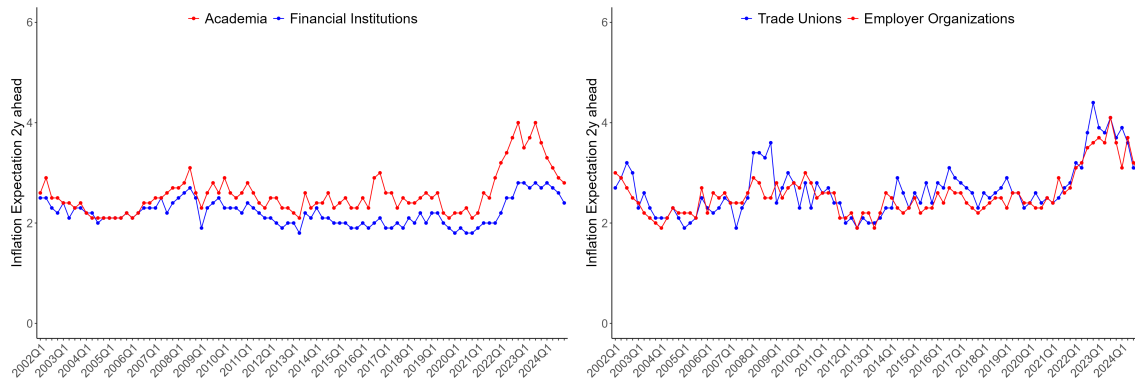
*p<0.1; **p<0.05; ***p<0.01

Note: Regression from model (3) for households, business leaders, economists and social partners. All models include time fixed effects, a dummy for living in the south and individual level controls. For households, controls include age, sex and occupational status; for business leaders sector and size.

C Figures



a All Agents



b Economists and Social Partners

Figure C.1: Timeseries of average inflation expectations (2 years ahead) since 2002
Note: The bottom left hand side graph plots academics and financial institutions, the bottom right hand side graph plots employer organizations and trade unions. The black line in (a) indicates CPI inflation in Norway.

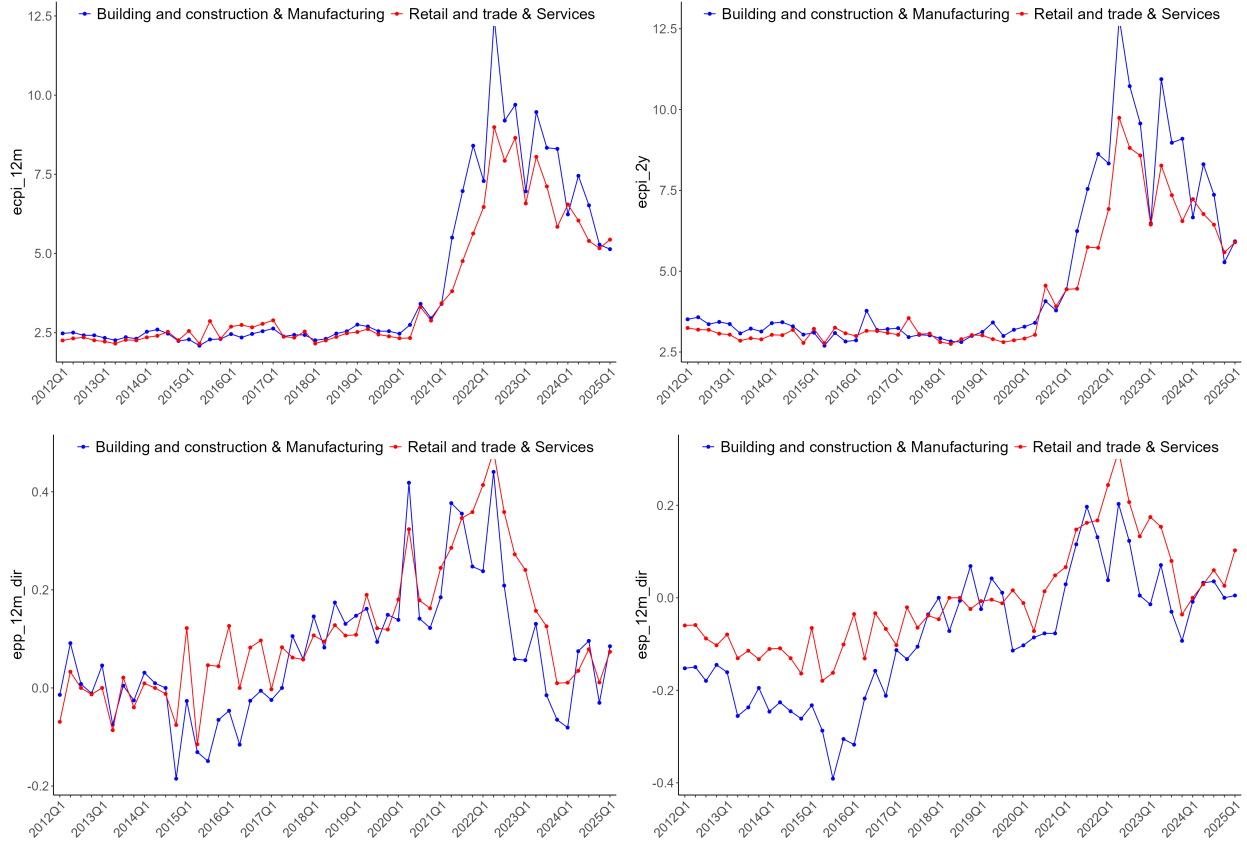


Figure C.2: Timeseries of business leaders' expectations by sector since 2012
Note: The top left hand side graphs plot short-term expectations (over the next 12 months) and the top right hand side graphs plot medium-term expectations (over the next 2 years). The bottom left hand side graphs plot the balance statistic for purchasing prices, the bottom right hand side or sales prices.

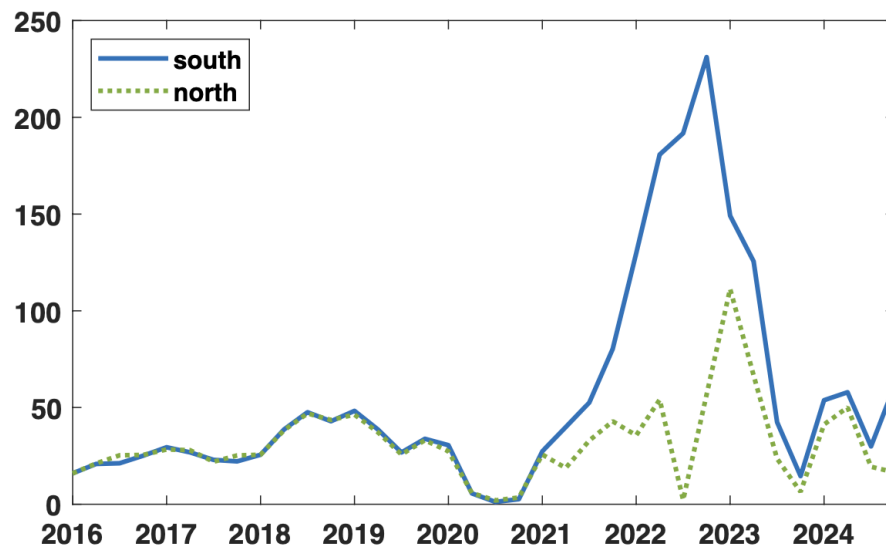


Figure C.3: Electricity prices in Southern and Northern Norway, NOK/KWh.

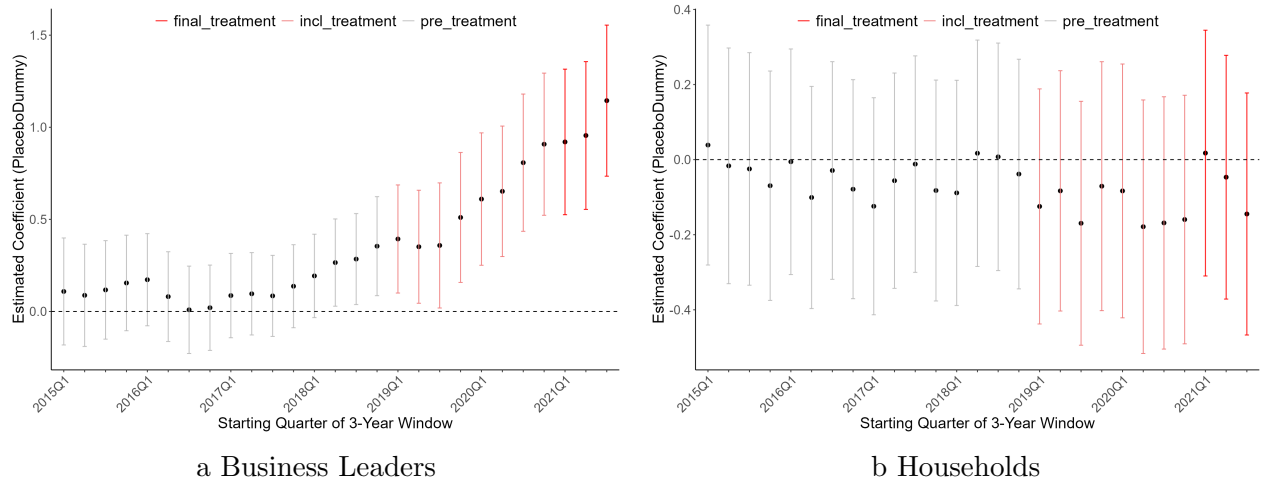


Figure C.4: Placebo Test Using Rolling 3 Year Treatment Windows

Note: The placebo test re-estimates the main regression (3) using moving 3-year windows (keeping the first 3 years as baseline) as artificial treatment periods. For each window, a placebo dummy is defined for the treated region, and the resulting coefficients are plotted together with the 95% confidence interval to check for spurious effects outside the actual intervention period. The gray windows are estimated over the pre-treatment period, the pink windows include some months of the treatment period and the red windows include only our final treatment window in the dummy.