

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

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The views expressed in this presentation are those of the authors and do not necessarily reflect those of Norges Bank.

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Research Question

Level Differences	Disagreement	Term Structure	Real Wages	Response to Energy Prices
Candia et al. (2023), D'Acunto et al. (2023) and Weber et al. (2022)		D'Acunto and Weber (2024), Huber et al. (2023)	Savignac et al. (2024), Jain et al. (2024), Hajdini et al. (2023), Buchheim et al. (2024)	Coibion and Gorodnichenko (2015), Wehrhofer (2023), Jo and Klopach (2024), Reis and Patzelt (2024)
Highest expectations for hh followed by firms and professionals	Largest disagreement for hh followed by firms and professionals	Strong pass-through from perceptions to expectations for hh	Low inflation wage pass-through for firms and hh	Hh inflation expectations respond to energy prices
Lowest accuracy for hh	Disagreement related to characteristics	Long-run less volatile than short-run for all		Firms expectations unaffected

1. Do differences across groups of agents depend on the fact that groups: (i) belong to heterogeneous countries and institutional setting; (ii) have different information sets? (iii) are asked questions differently?
2. Are these "facts" robust **over time**?
3. Do **Trade Unions** and **Employer organizations** behave more like households, firms or economists?

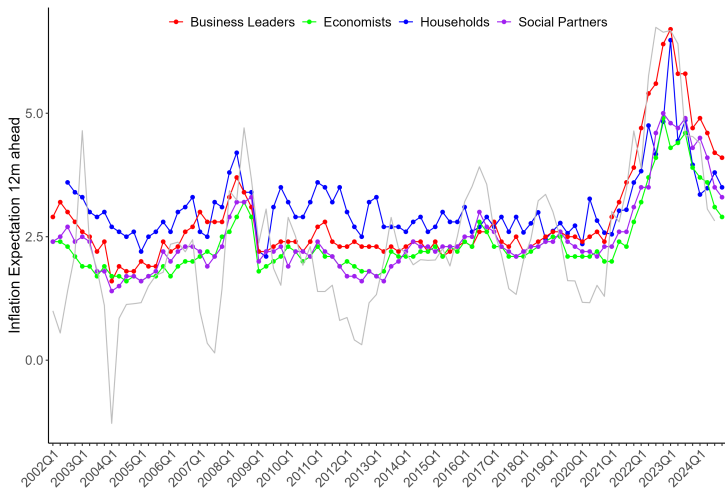
A Unique Survey of 4 Stakeholders in Norway

- Nationally representative survey of four groups:
 - 1 1000 households
 - 2 500 business leaders (CEOs, CFOs and purchasing managers)
 - 3 40 economists (experts in financial industry and academia)
 - 4 40 **social partners** (chief economists, general secretaries, CEOs of trade unions and employer organizations)
- Quarterly, since 2002Q1, individual data since 2008Q1, cross-section
- Survey fieldwork period: 20 days from middle of first month in quarter, before release of NAC and interest rate decision [timeline](#)
 - Groups are comparable as interviewed with the same information set
- Questions about inflation and wages at multiple forecast horizons

[details](#)

1. Level Differences

Average Inflation Expectations of 4 Groups



US Survey Data

Accuracy

	Households	Business Leaders	Social Partners	Economists
Panel A: 2002Q1-2021Q4				
RMSFE $h = 4$	1.56 <i>1.39</i>	1.24 <i>1.10</i>	1.20 <i>1.06</i>	1.13
RMSFE $h = 8$	2.34 <i>1.91</i>	1.67 <i>1.36</i>	1.27 <i>1.04</i>	1.23

economists most accurate, households way off

RMSFE and Relative RMSFE (italics) wrt economists by group, computed from average of point forecasts.

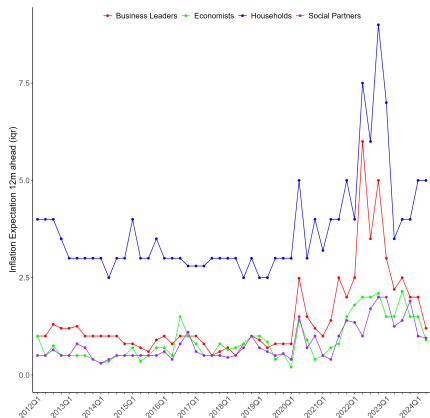
Accuracy

	Households	Business Leaders	Social Partners	Economists
Panel A: 2002Q1-2021Q4				
RMSFE $h = 4$	1.56 <i>1.39</i>	1.24 <i>1.01</i>	1.21 <i>1.06</i>	1.14
RMSFE $h = 8$	2.34 <i>1.91</i>	1.67 <i>1.36</i>	1.27 <i>1.04</i>	1.23
Panel B: 2022Q1-2024Q3				
RMSFE $h = 4$	2.21 <i>0.85</i>	2.26 <i>0.87</i>	2.49 <i>0.96</i>	2.59
RMSFE $h = 8$	2.06 <i>0.65</i>	2.38 <i>0.76</i>	2.88 <i>0.92</i>	3.14
hh and firms most accurate during the last three years				

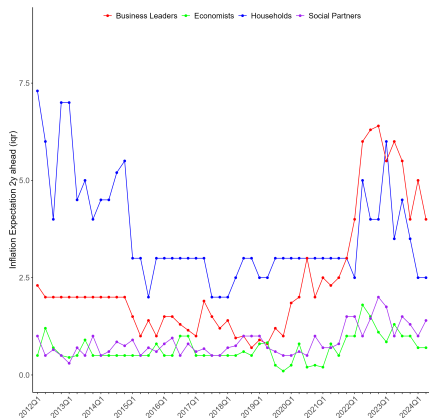
RMSFE and Relative RMSFE (italics) wrt economists by group, computed from average of point forecasts.

2. Disagreement

Disagreement over Time



(a) Short-term



(b) Medium-term

Interquartile range of inflation expectations

Summary Statistics of Households' Expectations

Group	$E_{t-4,t}$		$E_{t,t+4}$		$E_{t,t+8}$		N
	Mean	SD	Mean	SD	Mean	SD	
All	3.69	6.64	3.43	6.23	5.21	7.19	50655
Age							
< 35 years	4.18	8.1	3.98	7.78	6.66	9.62	12555
35 to 54 years	3.46	6.1	3.24	5.74	4.76	6.25	17146
55 to 64 years	3.42	5.72	3.25	5.54	4.58	5.79	8421
65 years	3.73	6.42	3.27	5.58	4.84	6.23	12533
Gender							
Man	3.55	6.59	3.31	6.26	4.83	6.69	27821
Woman	3.87	6.71	3.58	6.18	5.76	7.84	22834
Occupation							
Public sector	3.31	5.86	3.26	5.29	4.99	6.28	12302
Private sector	3.5	6.13	3.33	6.22	4.66	6.32	18343
Retired	3.96	6.79	3.45	5.87	5.21	6.94	13573
Unemployed	4.01	8.41	3.94	9.77	6.86	8.95	766
Student	4.55	8.76	4.07	8.16	7.63	10.76	4365

Summary Statistics of Firms' Expectations

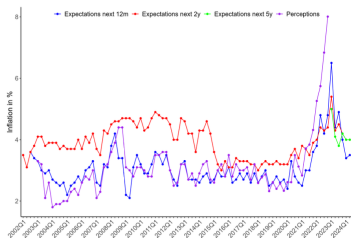
Group	E_{t+4}		E_{t+4}		E_{t+8}		N
	Mean	SD	Mean	SD	Mean	SD	
All	6.22	8.55	3.97	5.99	4.64	6.79	28890
Firm Size							
Less than 50	6.27	8.15	3.7	4.98	4.45	5.82	13072
Greater than 50	6.2	8.8	4.24	6.75	4.84	7.55	14162
Sector							
Manufacturing	6.98	10.01	4	6.63	4.6	7.43	6395
Retail & trade	6.18	8.28	4.01	5.42	4.7	6.14	5870
Building & construction	7.35	10.61	4.48	6.81	5.42	8.16	4469
Services	5.16	5.95	3.75	5.51	4.34	6.07	12125
Price Expectations							
" Sales	7.62	10.34	5.6	8.24	6.41	9.27	5065
# or = Sales	5.63	7.59	3.57	5.22	4.2	5.94	23826
" Purchasing	6.72	9.21	5.59	8.34	6.45	9.43	6528
# or = Purchasing	5.86	8.02	3.43	4.83	4.02	5.48	22363

Summary Statistics of Experts' Expectations

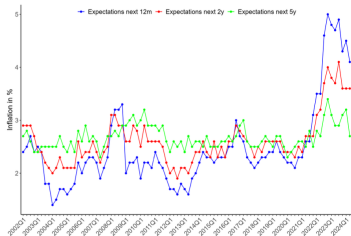
Group	$E_t \ t+4$		$E_t \ t+8$		$E_t \ t+20$		N
	Mean	SD	Mean	SD	Mean	SD	
Economists							
All	2.19	0.43	2.35	0.24	2.42	0.28	3829
Professional	2.05	0.33	2.15	0.21	2.25	0.22	1592
Academics	2.28	0.54	2.48	0.30	2.55	0.20	2237
Social Partners							
All	2.29	0.50	2.51	0.32	2.65	0.19	2261
Employer	2.25	0.48	2.47	0.30	2.67	0.25	1151
Employee	2.32	0.54	2.55	0.40	2.64	0.24	1110

3. Term Structure

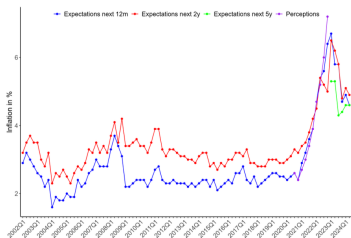
Expectations at Different Forecast Horizons



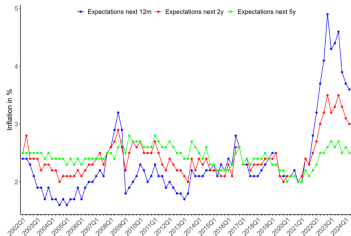
a Households



c Social Partners

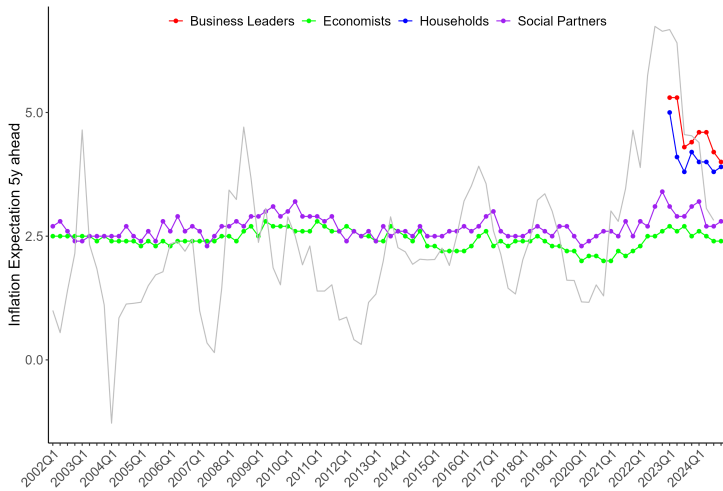


b Business Leaders



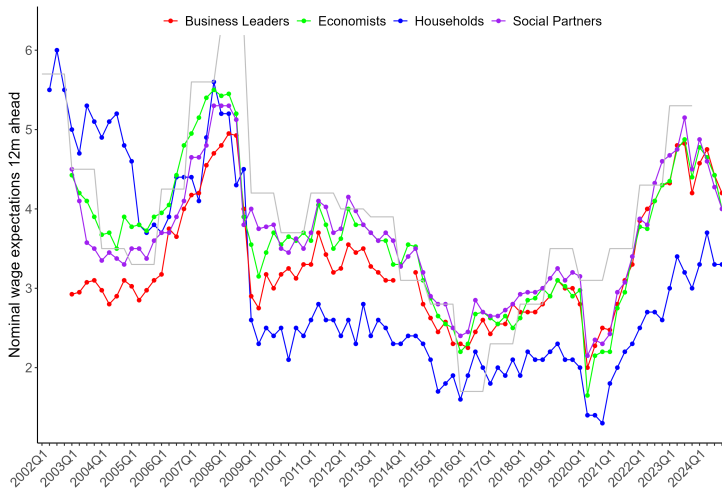
d Economists

Long Term Inflation Expectations

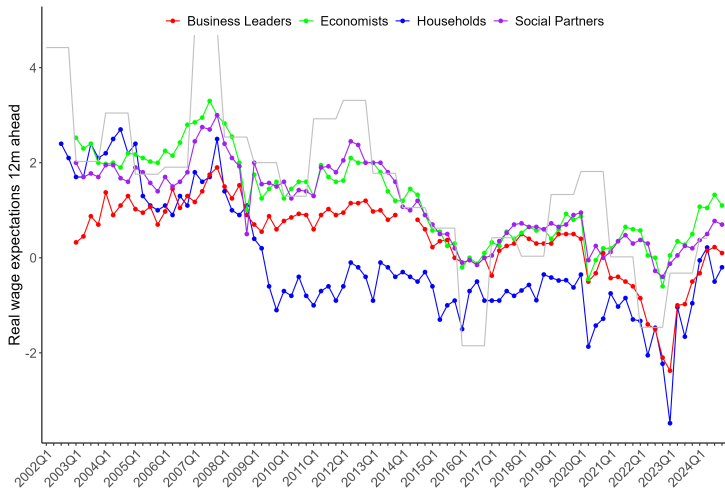


4. Inflation and Wages

Average Nominal Wage Expectations of 4 Groups



Average Real Wage Expectations of 4 Groups



Inflation-Wage Pass-through

	$E_{i,t}W_{i,t+4q}$			
	Households	Firms	Economists	Social Partners
Panel A: 2012 Q1 - 2021 Q3				
E_t $t+4$	0.118 (0.010)	0.428 (0.006)	0.144 (0.022)	0.124 (0.020)
Time FE	Yes	Yes	Yes	Yes
Observations	28,871	15,655	1,964	1,218
R ²	0.043	0.332	0.475	0.354
Panel B: 2021 Q4 - 2024 Q2				
E_t $t+4$	0.063 (0.013)	0.638 (0.009)	0.141 (0.023)	0.225 (0.024)
Time FE	Yes	Yes	Yes	Yes
Observations	8,527	4,738	488	380
R ²	0.061	0.517	0.377	0.330

Note:

$p < 0.1$; $p < 0.05$; $p < 0.01$

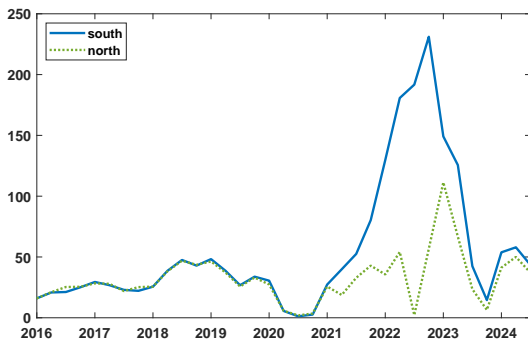
Controls: for hh age dummies, gender dummy; for firms sector and size dummies, for economists financial industry dummy, for social partners employer organization dummy.

5. Energy Prices and Inflation Expectations

Electricity Prices Shock

- Electricity price divergence in 2021Q2:
 - historically, electricity prices aligned between North and South
 - large divergence from 2021Q2

Figure: Electricity Prices in Norway, NOK/KWh



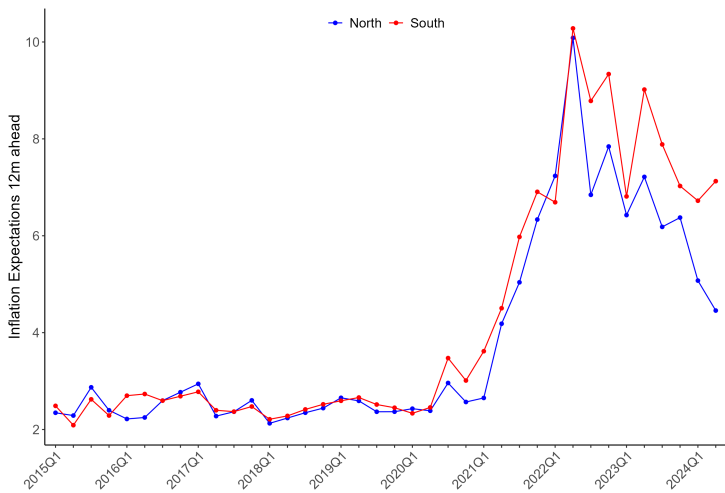
Pass-Through of Energy Prices to Inflation Expectations

$$E_{i;r;s;t} \quad t+h = \underbrace{r;s}_{\text{sector and region fe}} + \underbrace{t}_{\text{time fe}} + \theta \underbrace{D_{r;t}}_{\text{shock dummy}} + i;r;s;t \quad (1)$$

Assumptions:

- ① exogenous shock
 - supply: low water reservoirs in the South, little transmission capacity of electricity from North to South due to lacking infrastructure
 - demand: increased electricity demand from Europe
- ② parallel trends in expected inflation between North and South absent the shock

Firms' Inflation Expectations Aligned before Shock



Pass-through of Electricity Prices to Inflation Expectations

	Firms
$D_{r;t}$	0.416 (0.232)
Constant	2.657 (0.423)
Time FE	Yes
Sector \times Region FE	Yes
Observations	13,706
R^2	0.166
<i>Note:</i>	$p < 0.1$; $p < 0.05$; $p < 0.01$

Pass-through of Electricity Prices to Inflation Expectations

	Firms	Households
$D_{r;t}$	0.416 (0.232)	0.021 (0.163)
Constant	2.657 (0.423)	4.262 (0.289)
Time FE	Yes	Yes
Sector \times Region FE	Yes	
Group \times Region FE		Yes
Observations	13,706	42,240
R ²	0.166	0.044
<i>Note:</i>	p < 0.1;	p < 0.05; p < 0.01

Conclusions

Level Differences	Disagreement	Term Structure	Real Wages	Response to Energy Prices
Highest expectations for hh followed by firms and economists	Largest disagreement for hh followed by firms and economists	Hh short-term expectations based on perceptions	Low inflation wage pass-through for firms and hh	Hh inflation expectations greatly affected by energy prices
Lowest accuracy for hh	Disagreement related to characteristics	Long-run and short-run are closely linked		Firms expectations unaffected

Conclusions

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Lowest accuracy for hh	Disagreement related to characteristics	Long-run and short-run are closely linked		Firms expectations unaffected
New answers				
Since 2021 firms' exceeded households' expectations Social partners behave roughly like economists	Disagreement similar to other surveys, increasing post 2021	Perceptions feed into short-run but link decoupled in 2021 Social partners and economists are more anchored , only economists spotted target change in 2018	Households and firms perceived fall in real wages since 2021 Pass-through decreased for households post 2021 but increased for firms and social partners	Firms respond to energy price increase

Policy implications

- ① Norway is not too different
 - Conclusions drawn from other European and US surveys are likely to apply in Norway
- ② “Stylized Facts” are time varying
 - Policy recommendations based on survey expectations should take current and local environment into account
- ③ Social Partners behave closest to Economists
 - Conclusions from standard macro models are likely to apply to Norwegian labor market

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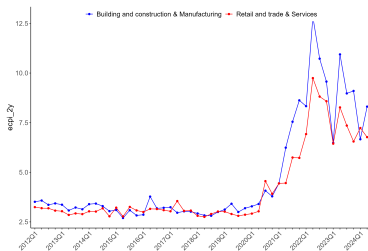
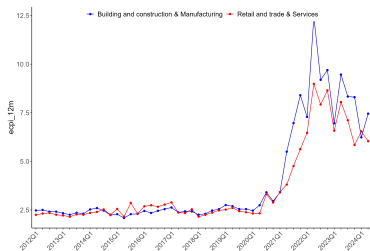
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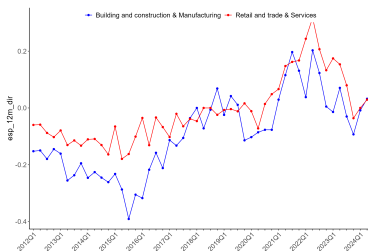
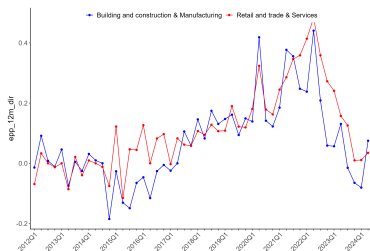
Survey Details

- Household Characteristics:
 - residents of Norway, 15 and above
 - age, gender
 - occupation: student, private sector, public sector, self-employed, stay-at-home, unemployed, retired
 - location: Northern, Mid, Eastern, Western, Southern, Oslo
- Firms Characteristics:
 - firms with 20 employees and above
 - size: # employees
 - sector: student, private sector, public sector, self-employed, stay-at-home, unemployed, retired
 - location: Northern, Mid, Eastern, Western, Southern, Oslo
- Economists:
 - academia vs financial industry
- Social Partners

Sectors and Sales and Purchasing Prices



(a) Inflation expectations



Household Inflation Expectations by Region

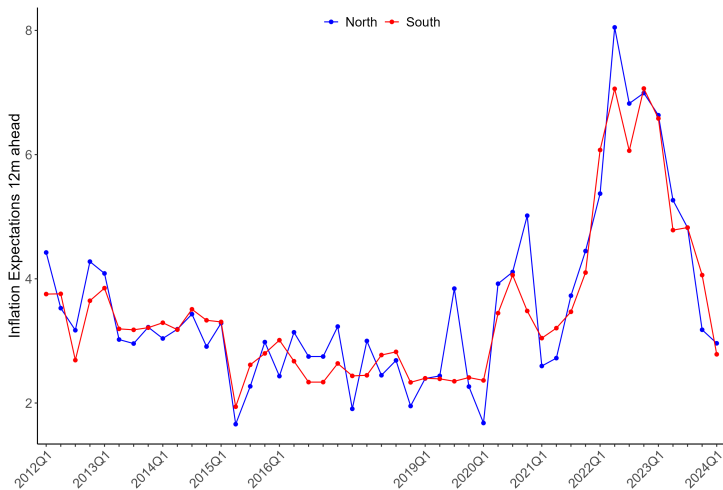
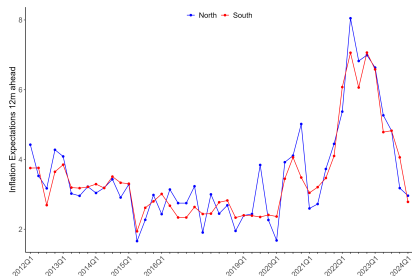
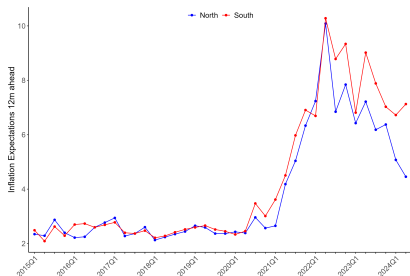


Figure: Average point forecasts in north and south Norway

Electricity price shock 2022



(a) Households

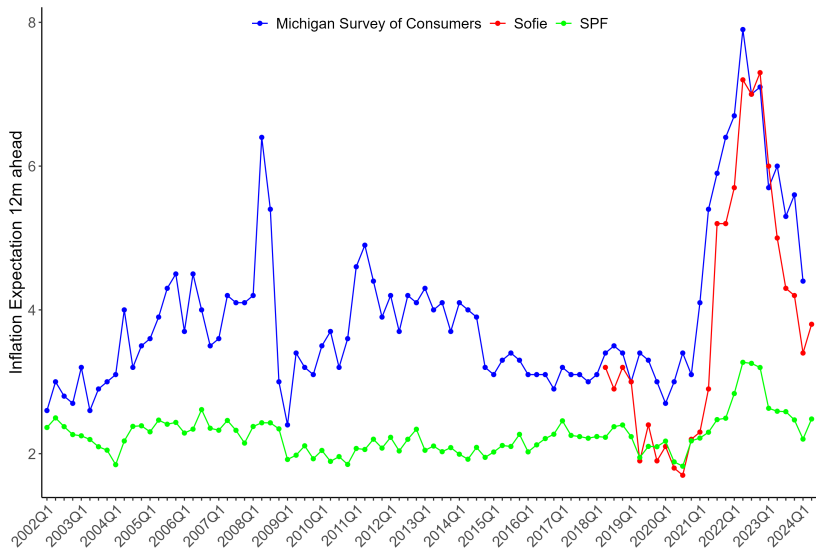


(b) Business Leaders

Figure: Average point forecasts in north and south Norway

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US Surveys



Timeline

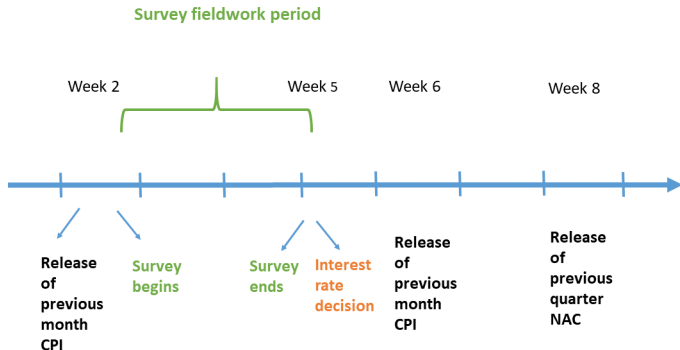
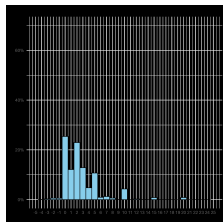


Figure: Timeline of Survey Fieldwork

Inflation 12m ahead: Histograms pre- and post-2021 Q3



(a) Households

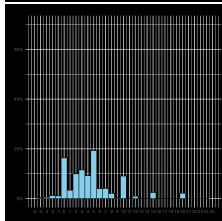
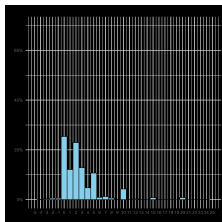
(b) Business Leaders

(c) Economists

(d) Social Partners

Responses larger than 100 in absolute value are trimmed from the sample

Inflation 12m ahead: Histograms pre- and post-2021 Q3



(a) Households

(b) Business Leaders

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Responses larger than 100 in absolute value are trimmed from the sample