

Investment decisions in a high inflationary environment

Marco Schito (PPMI), marco.schito@ppmi.it

Luka Klimavičiūtė (PPMI), luka@ppmi.it

Rozália Pál (EIB), r.pal@eib.org

Presentation for the EEA ESEM Congress

PPMi

Part of the
Verian Group



**European
Investment Bank**

Rotterdam (NL), 27th August 2024

Background and rationale

Investment needed for firms to grow, but investment is riskier when the economic environment becomes uncertain (Dejuan-Bitria & Ghirelli, 2021; Kellogg, 2014; Larch et al., 2022).



Post-COVID-19 bounce-back
(Harasztosi et al., 2022)



National and EU policies to keep the economy afloat during the energy crisis
(SME Envoys, 2022b)



Disruption of trade routes due to the Russian war of aggression against Ukraine
(Brasili & Harasztosi, 2023; EIB, 2022; SME Envoys, 2022a)

Background and rationale

Investment needed for firms to grow, but investment is riskier when the economic environment becomes uncertain (Dejuan-Bitria & Ghirelli, 2021; Kellogg, 2014; Larch et al., 2022).



Post-COVID-19 bounce-back
(Harasztosi et al., 2022)



National and EU policies to keep the economy afloat during the energy crisis
(SME Envoys, 2022b)



Disruption of trade routes due to the Russian war of aggression against Ukraine
(Brasili & Harasztosi, 2023; EIB, 2022; SME Envoys, 2022a)

Does increasing inflation affect firms' investment decisions?

How inflation can affect investment

01

Internal sources of financing

- Inflation can increase the labour and production costs relative to the firms' revenues, squeezing their profit margins.
- Despite the major increase in production costs and monetary tightening, firms have on average remained profitable (EIB, 2024).



External sources of financing

- To counter inflation, central banks increase interest rates. Making the cost of borrowing higher affects firms' accessibility of external funding, especially among SMEs (Andersson et al., 2023; EIB, 2024; PPMI et al., 2023).

02



Data and methods I - EIBIS

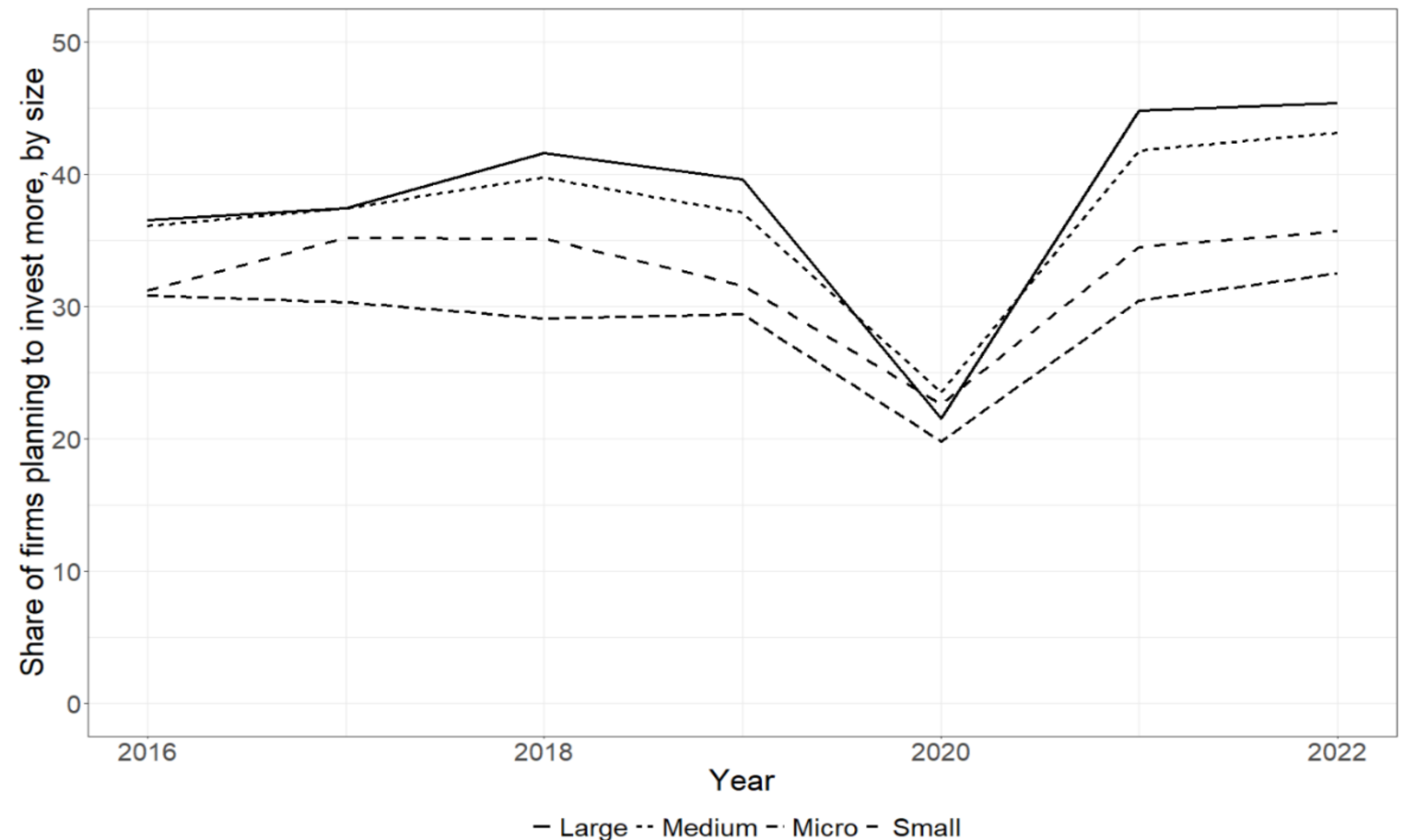
The EIBIS dataset

European Investment Bank's Investment Survey (EIBIS), 7th wave, 2016-2022

Main dependent variable: Whether expectations on total investment for the current financial year will be higher than the previous one

- Out of 82,795 surveyed firms, 35.24% foresee positive investment trends
- Significant fall in 2020 due to COVID-19
- Micro-firms least likely to see increased investment

Trends in investment expectations



Source: Authors' elaboration based on EIBIS 2022 wave.

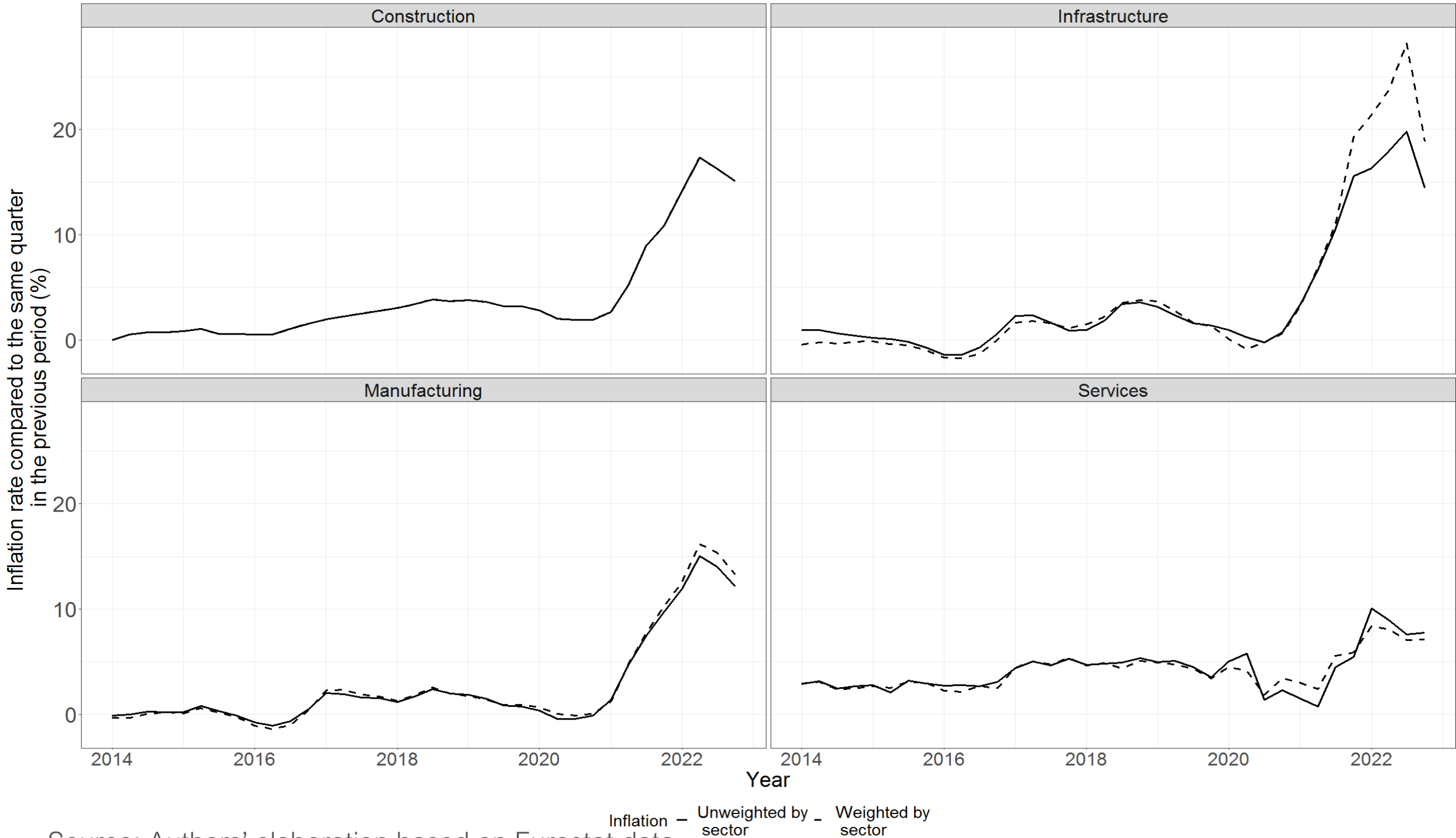
Note: All values are weighted by the value added provided by the surveyed firms.

Data and methods II - inflation

Classification

Sector	NACE 2-digit codes	Inflation type	Data source
Manufacturing	C10-C33	PPI	Eurostat STS_INPP_Q
Construction	F41-F43	CPPI	Eurostat STS_COPI_Q
Services	G45-G47, I55-I56	LCI	Eurostat LC_LCI_R2_Q
Infrastructure	D35, E36, H49-H53, J58-J63	PPI (D, E) and SPPI (H, J)	Eurostat STS_INPP_Q, Eurostat STS_SEPP_Q

Trends in inflation



Source: Authors' elaboration based on Eurostat data.
 Note: producer prices for construction, infrastructure and manufacturing are not directly comparable with labour cost indices employed for services. A comparison of labour costs across all sectors is available in Figure A.3 in the Appendix.

Data and methods III - estimation

Model function

Generalised linear model with a logistic link function

$$y_{ij,t} = \alpha_{ij,t} + \beta X_{ij,t-2} + \gamma Z_{ij,t} + \delta C_{i,t} + \theta FE_{ij,t} + \varepsilon_{ij,t}$$

Models for:

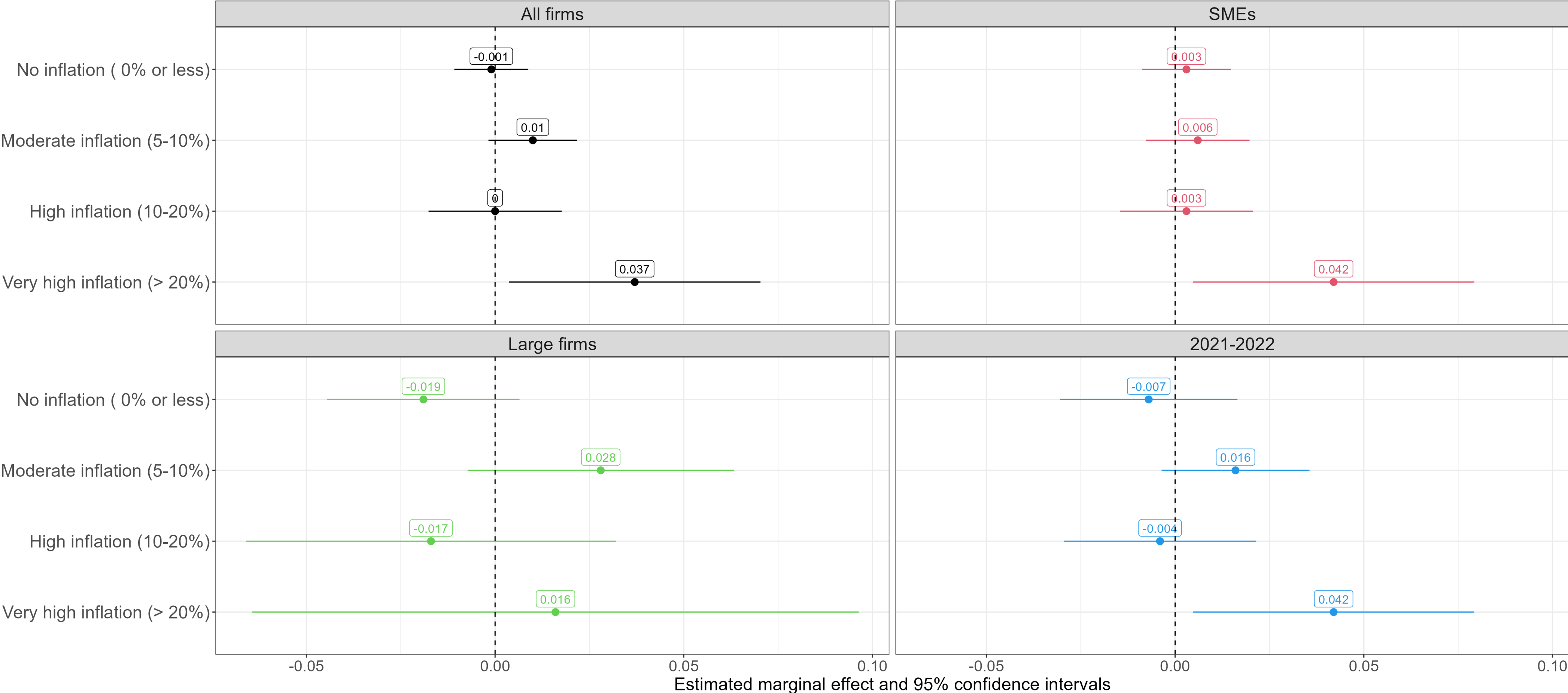
- Entire 2016-2022 sample
- All firms, SMEs only, large firms only
- The years 2021-2022 only

Other controls

- Size and age of the firm
- Whether the firm is in a high-tech sector
- Obstacles to investment: lack of skilled staff, and uncertainty about the future of the economy
- Profitability of the firm
- Firm's expectations on whether external financing will improve, stay the same or deteriorate
- Financing constraints
- Macroeconomic environment: GDP growth rate and interest rates

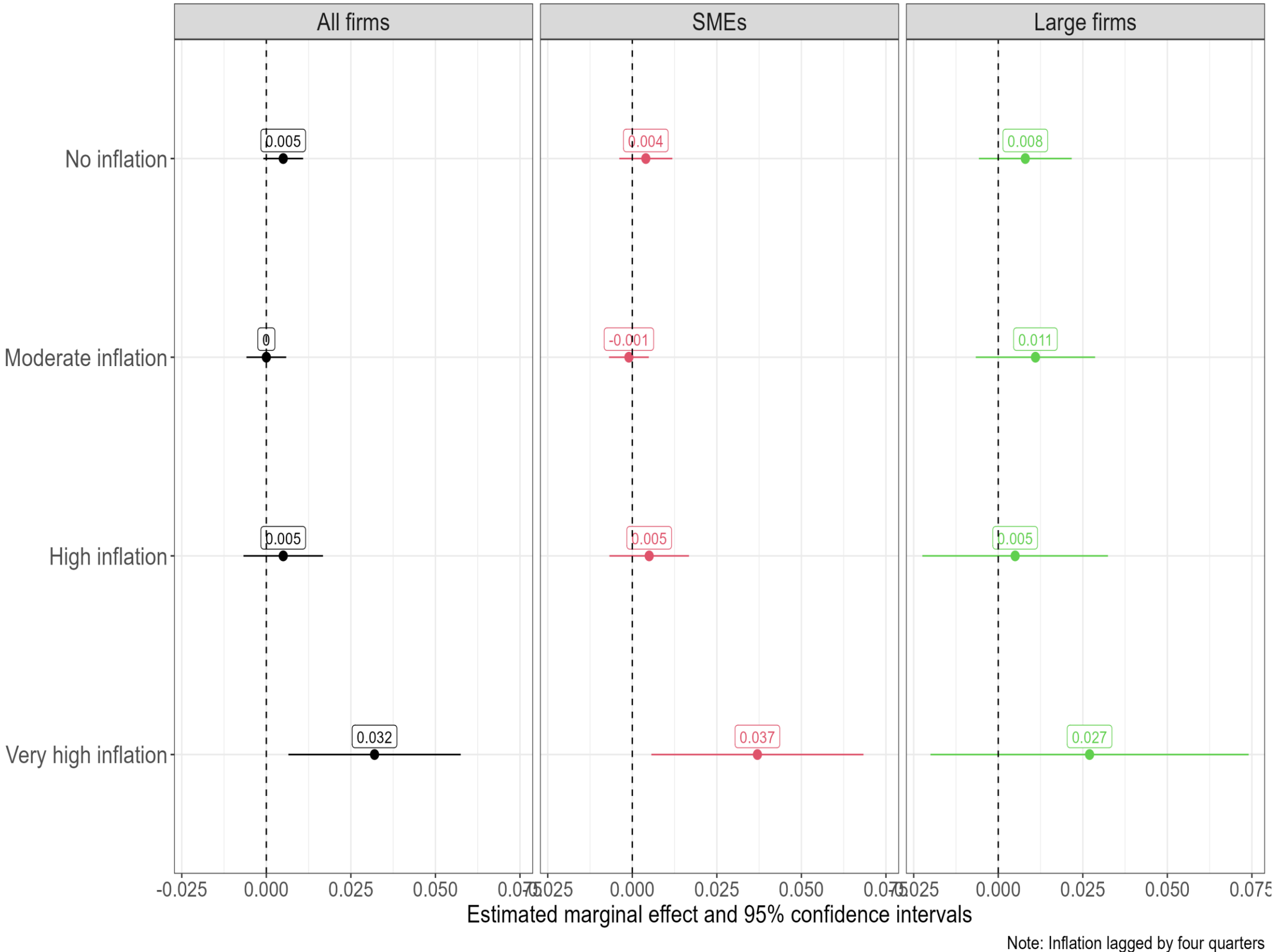
Main findings I – effect of inflation

Marginal effect of inflation levels on the probability of undertaking more investment in the current financial year
 Compared with a situation of low inflation (0-5%)

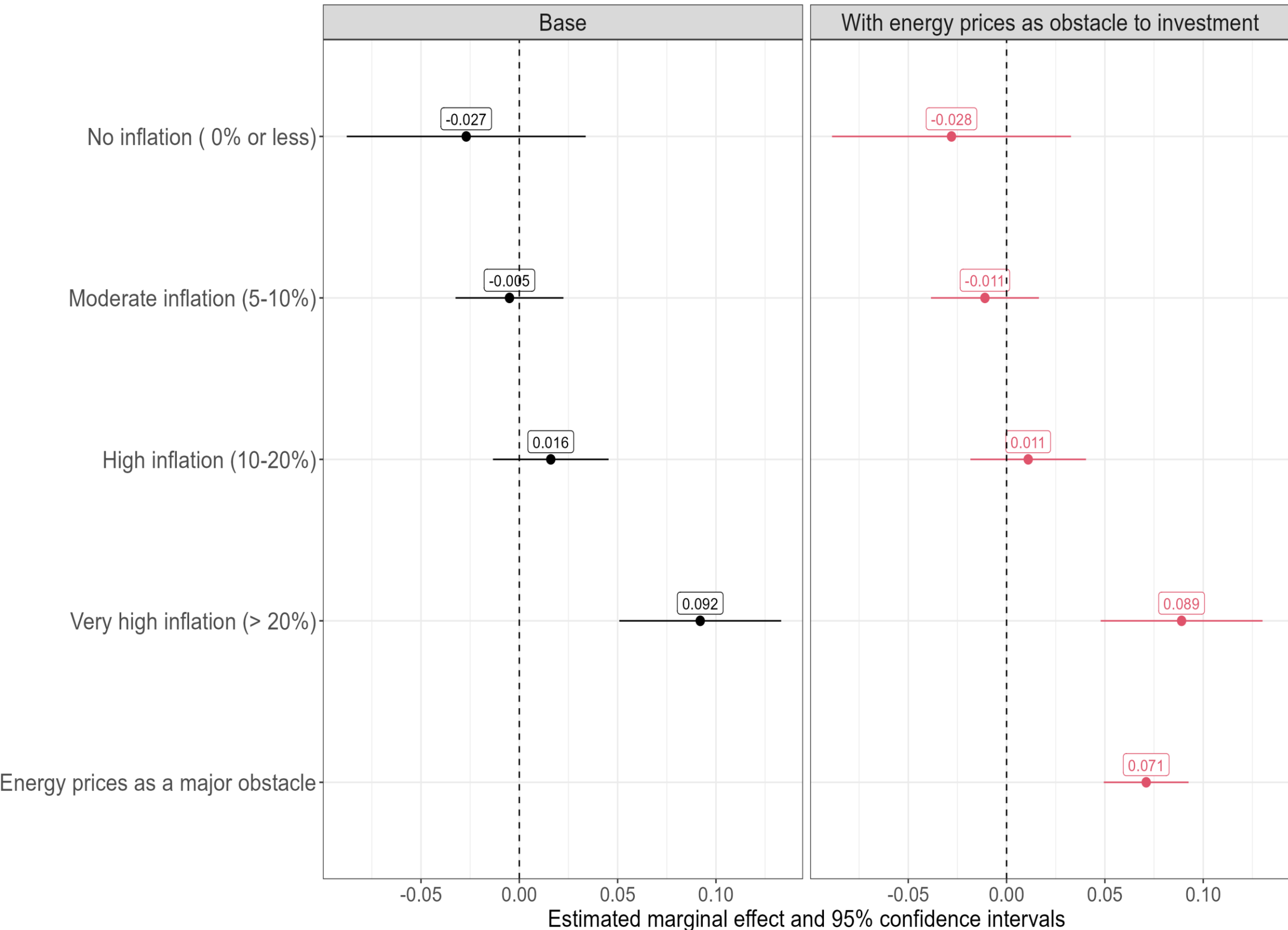


Main findings II – the importance of energy investment

Marginal effect of inflation levels on the share of total investment spent for energy efficiency in the previous financial year
Compared with a situation of low inflation (0-5%)

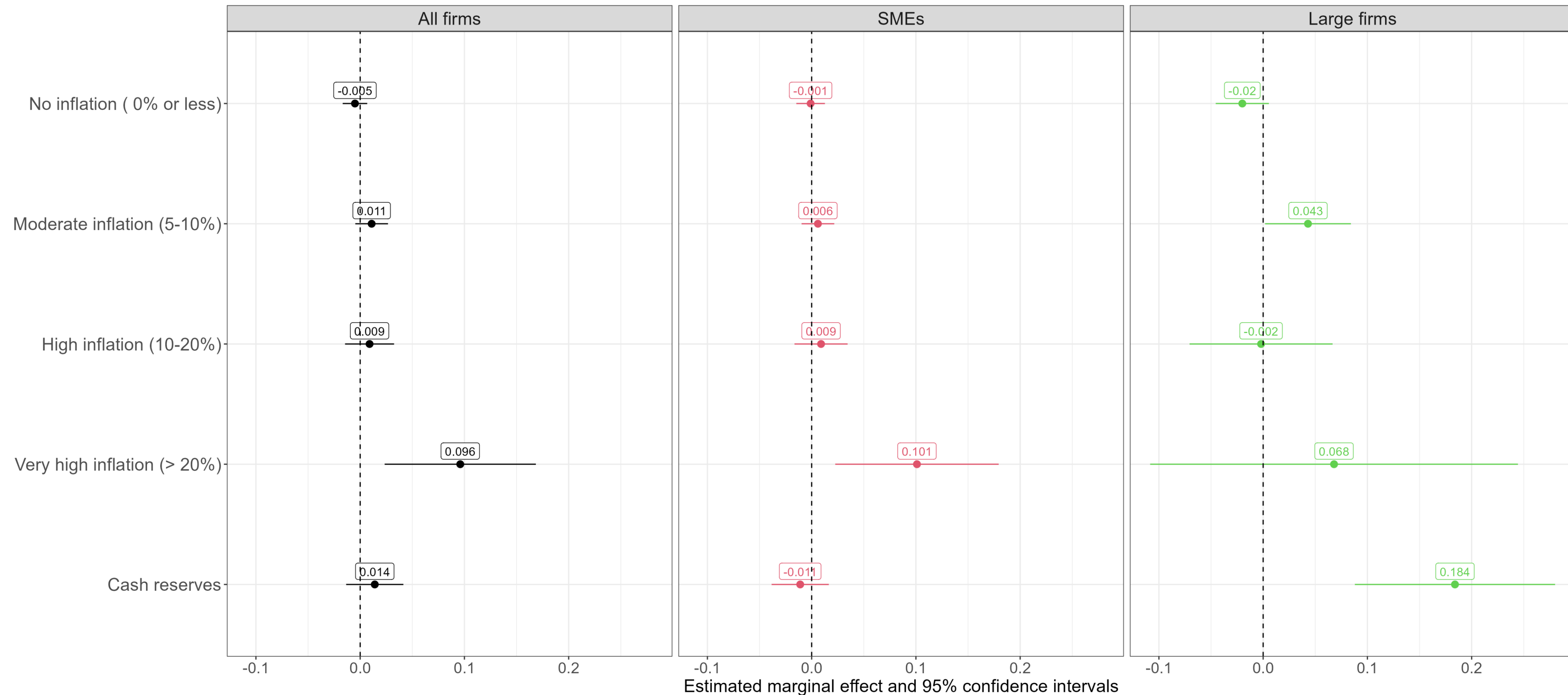


Marginal effect of inflation levels on the probability of making investment in energy efficiency measures in 2022
Compared with a situation of low inflation (0-5%)



Main findings III – the importance of cash reserves

Marginal effect of inflation levels on the probability of undertaking more investment in the current financial year
Compared with a situation of low inflation (0-5%)



The role of cost pass-through for investment I

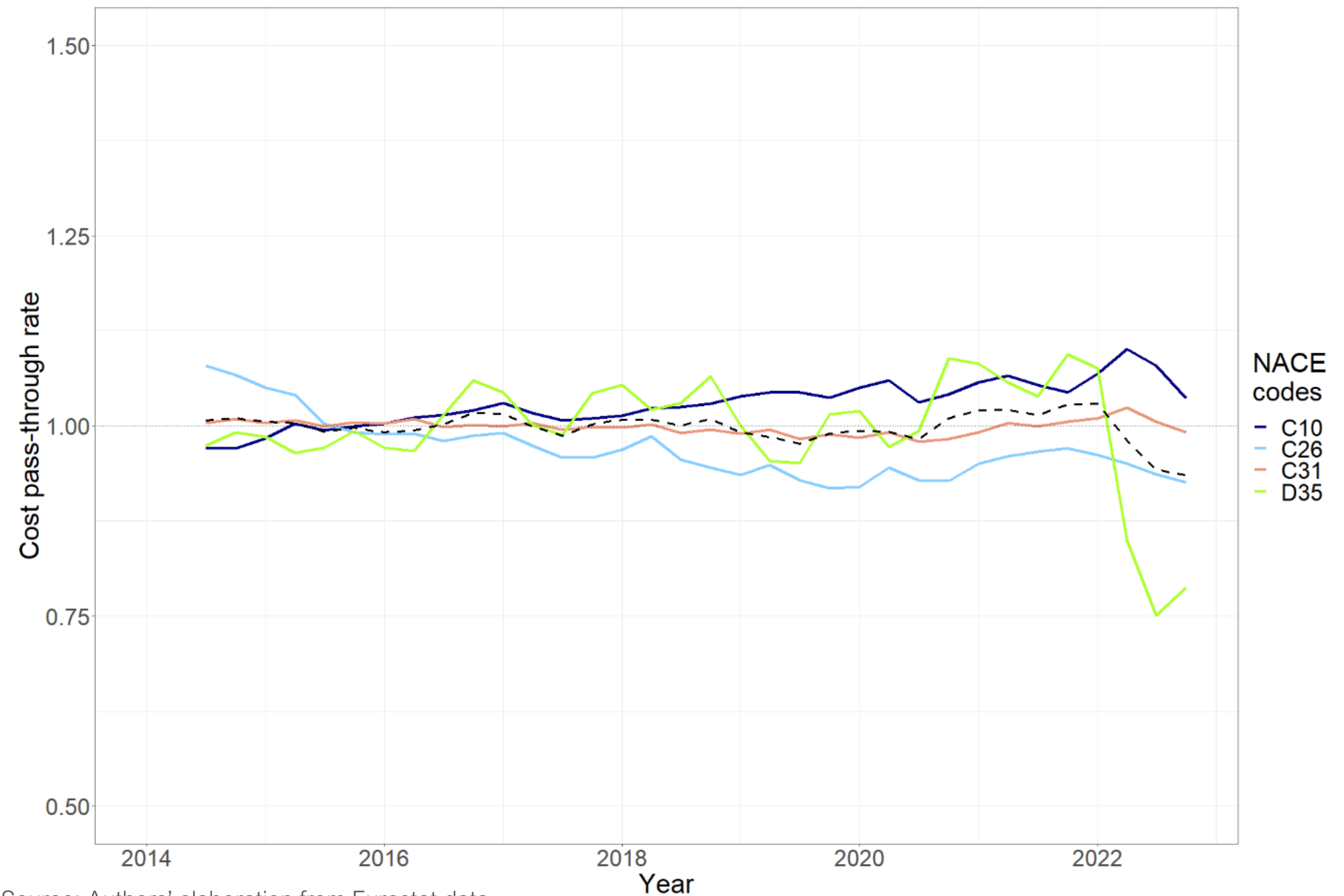
Calculation of the pass-through rate

The cost pass-through rate (PTR) captures how increases in input costs are reflected in increases in output prices, and therefore how much of this increase is passed onto consumers.

$$PTR_{ij,t} = \frac{\text{Consumer price index}_{ij,t}}{\text{Producer price index}_{ij,t-2}}$$

Focus on a few manufacturing NACE 2-digit sectors + energy sector.

Trends in the PTR



Source: Authors' elaboration from Eurostat data.

Note: the dashed line is an average of the four NACE codes. Several countries do not have values for these NACE codes. Eurostat averages information from 21 Member States, excluding Cyprus, Estonia, Latvia, Luxembourg, Malta and Slovakia.

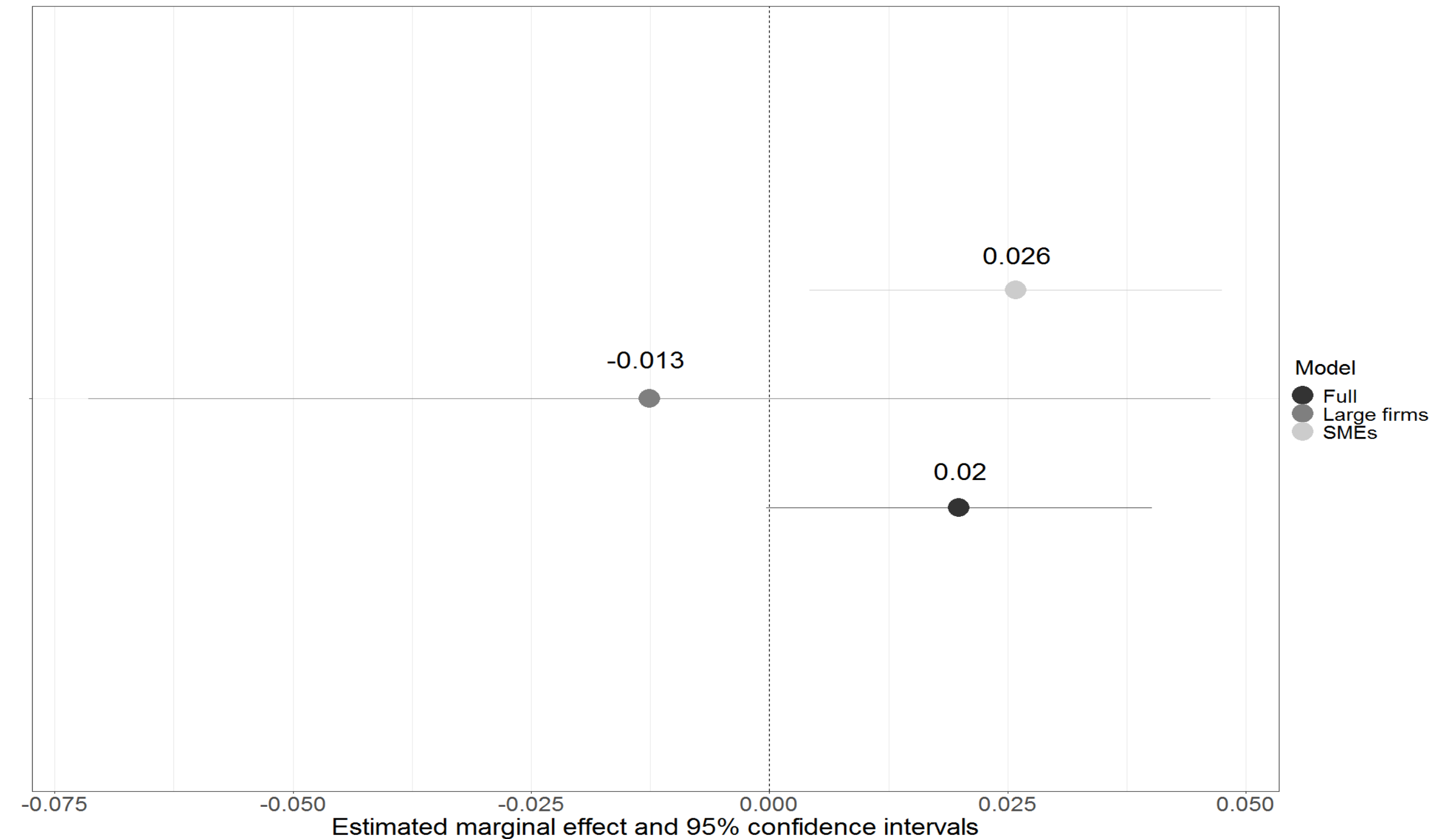
The role of cost pass-through for investment II

PTR results for 2016-2022

	Model 1	Model 2	Model 3
	All firms	SMEs	Large firms
PTR	0.113	0.184	-0.147
	(0.070)	(0.101)	(0.173)
Categorical inflation	x	x	x
Control variables	x	x	x
Country-fixed effects	x	x	x
Year-fixed effects	x	x	x
Num. Obs.	6,260	4,621	1,607

Note: marginal effects presented. Standard errors in parentheses. + p < 0.1; * p < 0.05; ** p < 0.01; *** p < 0.001.

PTR for energy costs in 2023



Note: analyses using EIBIS 2023 wave. The model includes having more investment as a binary dependent variable and deciding to pass energy costs onto customers as a binary independent variable. The model also controls for size, age, profitability, obstacles to investment (lack of skilled workers and uncertainty about the future), whether the firm is in a high-tech sector, availability of external financing, and financing constraints. N = 9,058 in the full model.

Conclusions

Summary of main findings

1. **Very high inflation environment** (year-on-year change > 20%) associated with higher probability of undertaking more investment:
 - Because of energy investment (for SMEs)
 - Through the use of cash reserves (for large firms)
2. Positive association between passing costs onto consumers and the probability of undertaking investment among SMEs, but not large firms – especially when it comes to **passing energy costs**.

Limitations

- Use of LCI data for the services sector means no direct comparability
- The PTR analysis could only be conducted on manufacturing
- Findings are associational, not causal, and contingent on the specific nature of this inflation bout

Policy implications

- Need to **ease the economic uncertainty**, especially for those innovative, small and young firms that are on the track for transformation
- Possibility to **develop and offer alternative financing sources** fitting the risk profile of firms in their longer-term investments for transformation
- **Special focus to SMEs** operating in a highly competitive market or whose demand is strongly price-elastic

Thank You

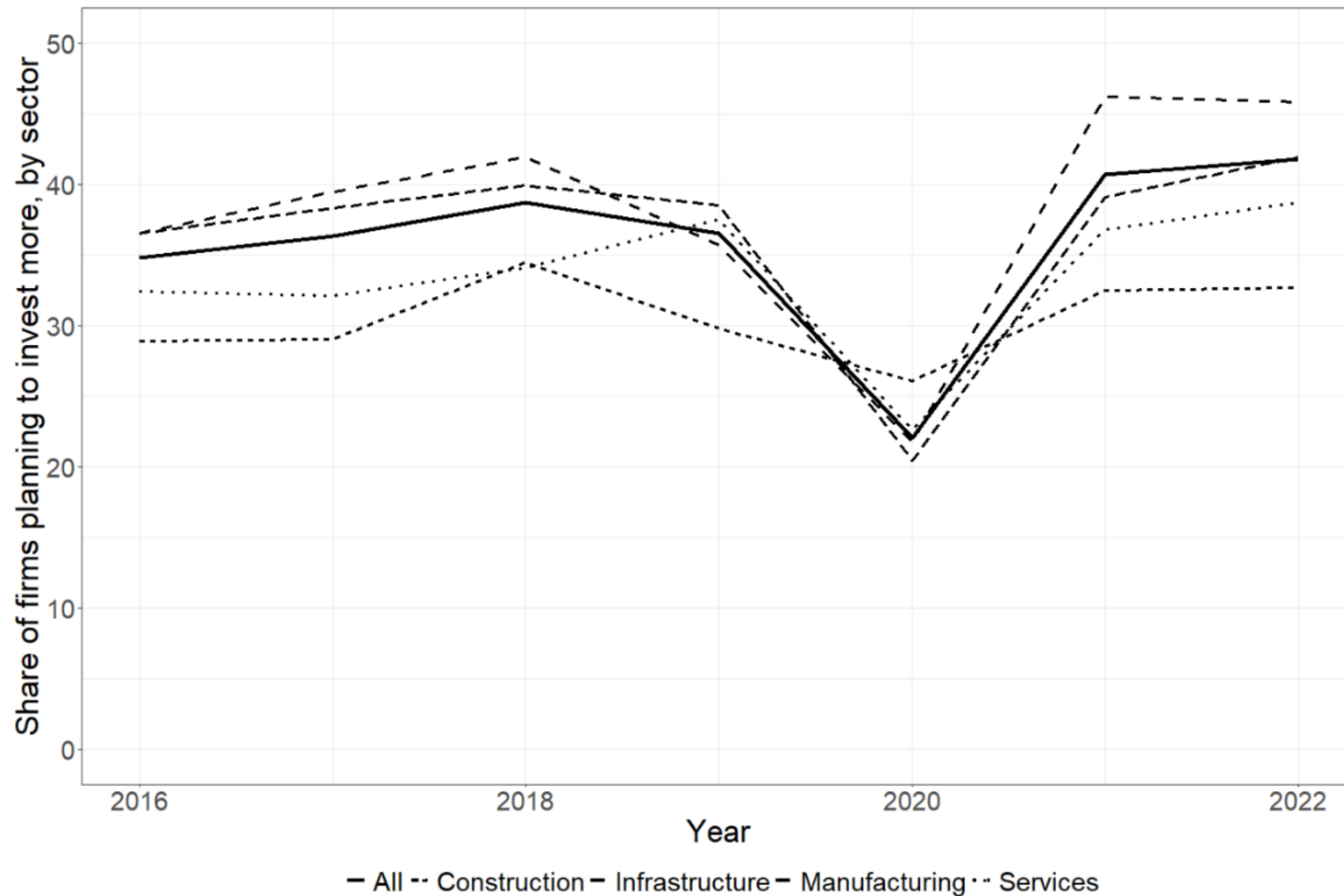


PPMi

Part of the
Verian Group

Gedimino ave. 50, LT-01110 Vilnius,
Lithuania
www.ppmi.lt

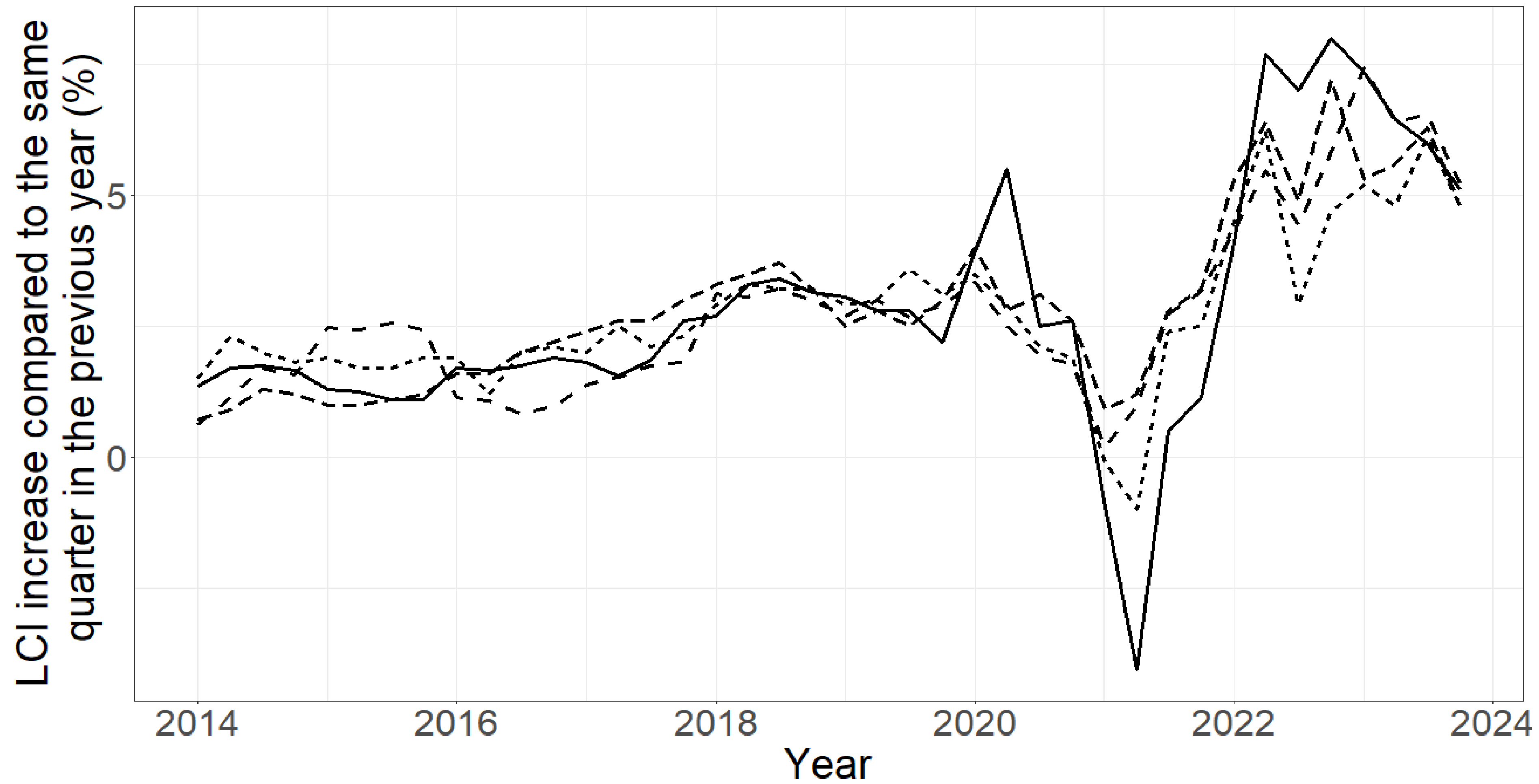
Appendix



Source: Authors' elaboration based on EIBIS 2022 wave.
 Note: All values are weighted by the value added provided by the surveyed firms.

01

Share of firms expecting more investment in the current financial year (%), 2016-2022

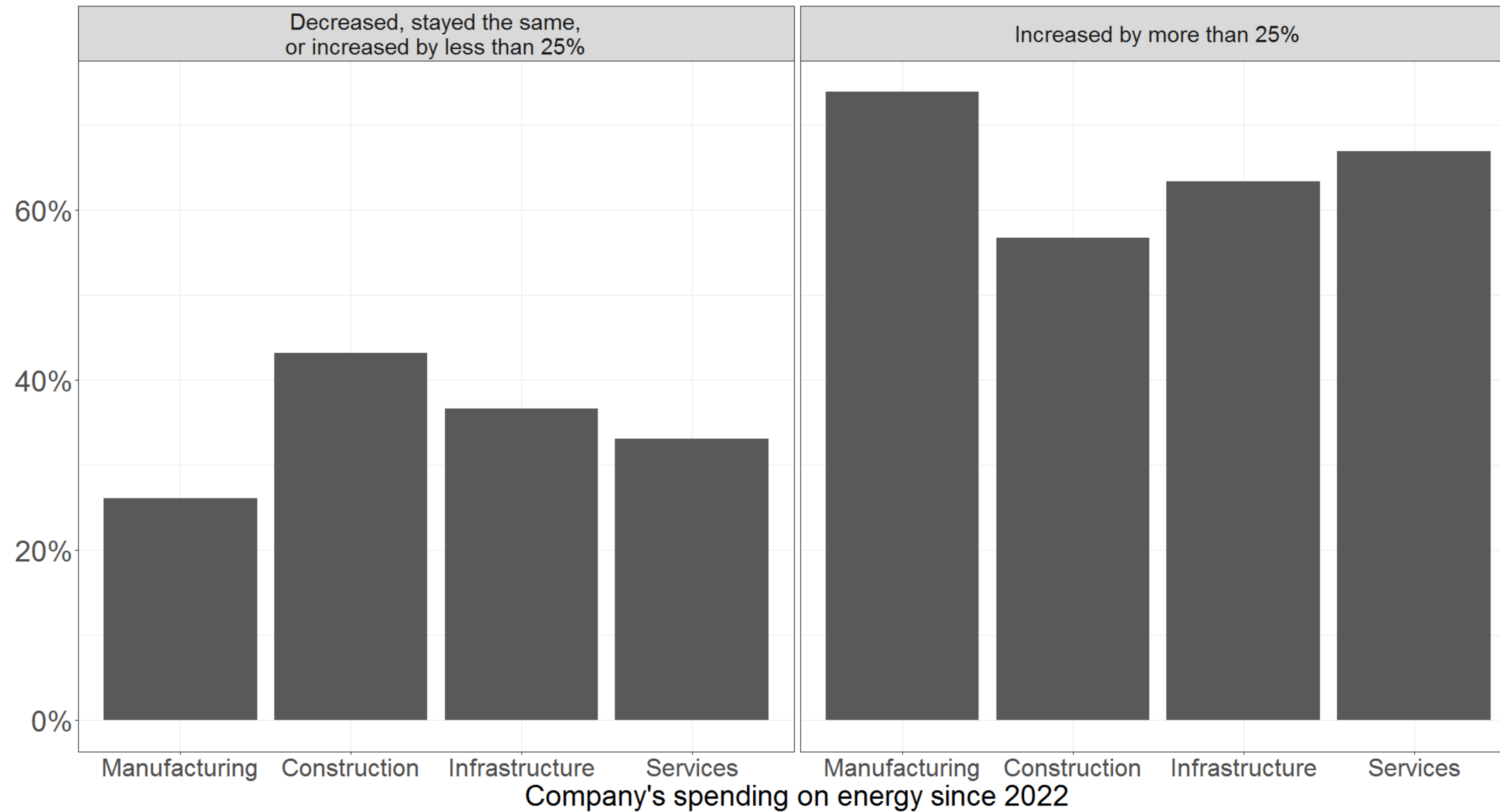


Sector — Services -- Manufacturing -· Construction - Infrastructure

Source: Authors' elaboration based on Eurostat table lc_lci_r2_q.

02

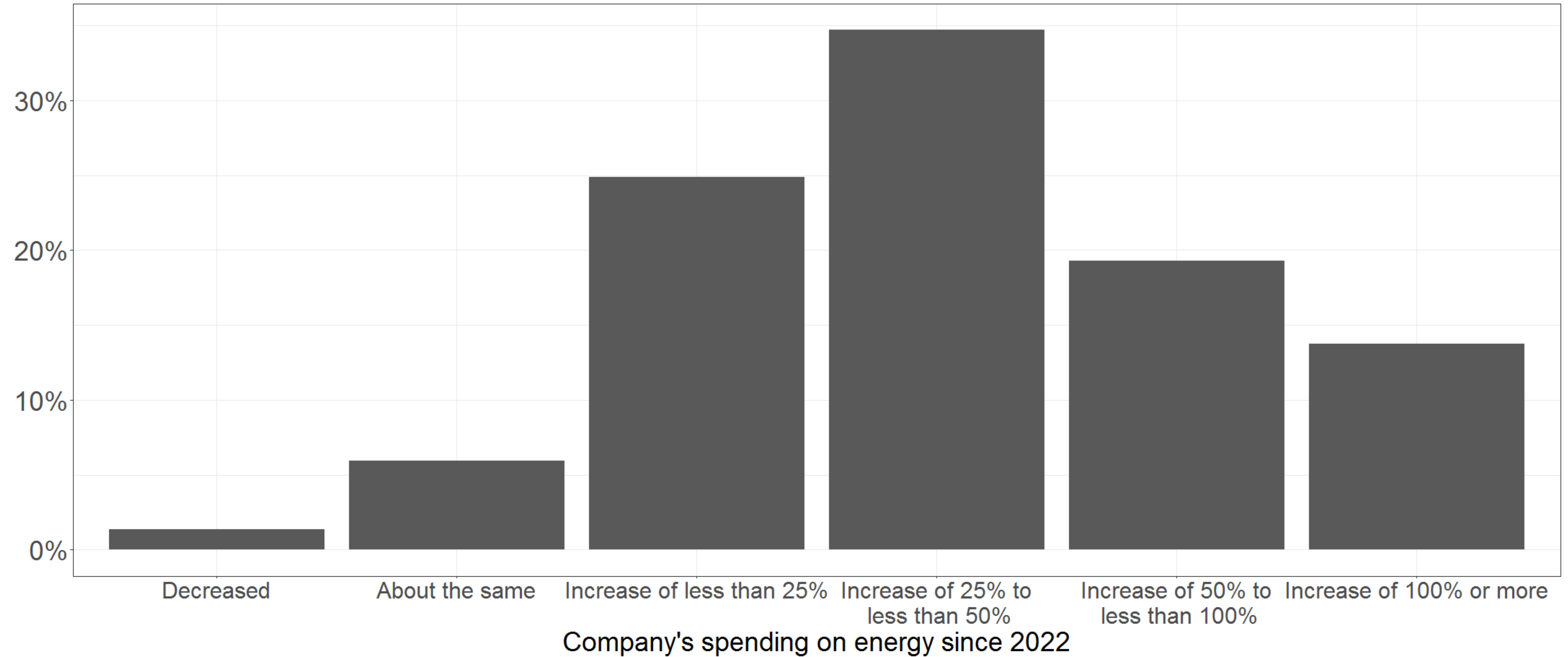
Labour cost indices for the main economic sectors in the EU-27, 2014-2023



Source: Authors' elaboration based on EIBIS 2023 wave.
 Note: All values are weighted by the value added provided by the surveyed firms.

03

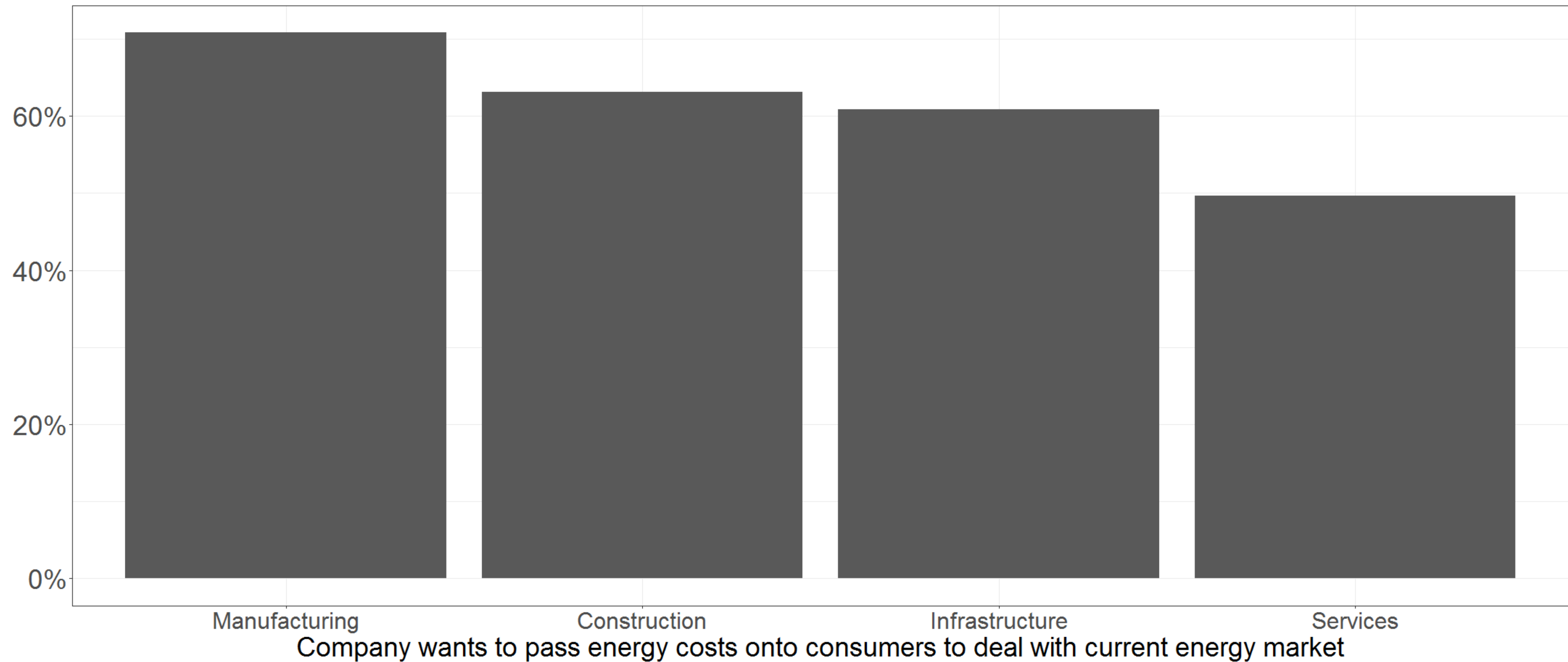
Increases in companies' spending on energy since 2022 for all sectors



Source: Authors' elaboration based on EIBIS 2023 wave.
 Note: All values are weighted by the value added provided by the surveyed firms.

04

Increases in companies' spending on energy since 2022



Source: Authors' elaboration based on EIBIS 2023 wave.

Note: All values are weighted by the value added provided by the surveyed firms.

05

Share of companies wanting to pass energy costs onto consumers to deal with the current energy market, 2023

	Model 1	Model 2	Model 3	Model 4	Model 5
	Raw inflation	Categorical inflation			
		All firms	SMEs	Large firms	2021-222 only
Inflation rate	0.001* (0.000)				
Inflation rate, categorical (ref = low inflation: 0-5%)					
No inflation (0% or less)		-0.001 (0.005)	0.003 (0.006)	-0.019 (0.013)	-0.007 (0.012)
Moderate inflation (5-10%)		0.010 (0.006)	0.006 (0.007)	0.028 (0.018)	0.016 (0.010)
High inflation (10-20%)		0.000 (0.009)	0.003 (0.009)	-0.017 (0.025)	-0.004 (0.013)
Very high inflation (>20%)		0.037* (0.017)	0.042* (0.019)	0.016 (0.041)	0.042* (0.019)
Control variables	x	x	x	x	x
Country-fixed effects	x	x	x	x	x
Year-fixed effects	x	x	x	x	x
Num. Obs.	62,134	62,134	52,425	9,709	18,613

Note: marginal effects presented. Standard errors in parentheses. + p < 0.1; * p < 0.05; ** p < 0.01; *** p < 0.001.

06

Marginal effect of inflation on the probability of undertaking more investment in the current financial year

	Model 1	Model 2	Model 3	Model 4	Model 5
	Proportion of total investment spent for energy efficiency in the previous financial year			Investment in energy efficiency measures in 2022	
	All firms	SMEs	Large firms		
Lagged inflation rate, categorical (ref = low inflation: 0-5%)					
No inflation (0% or less)	0.005 (0.003)	0.004 (0.004)	0.008 (0.007)		
Moderate inflation (5-10%)	0.000 (0.003)	-0.001 (0.003)	0.011 (0.009)		
High inflation (10-20%)	0.005 (0.006)	0.005 (0.006)	0.005 (0.014)		
Very high inflation (>20%)	0.032* (0.013)	0.037* (0.016)	0.027 (0.024)		
Inflation rate, categorical (ref = low inflation: 0-5%)					
No inflation (0% or less)				-0.027 (0.031)	-0.028 (0.031)
Moderate inflation (5-10%)				-0.005 (0.014)	-0.011 (0.014)
High inflation (10-20%)				0.016 (0.015)	0.011 (0.015)
Very high inflation (>20%)				0.092*** (0.021)	0.089*** (0.021)
Energy prices as a major obstacle					0.071*** (0.011)
Control variables	x	x	x	x	x
Country-fixed effects	x	x	x	x	x
Year-fixed effects	x	x	x	x	x
Num. Obs.	38,818	32,738	6,080	9,356	9,335

Note: marginal effects presented. Standard errors in parentheses. + p < 0.1; * p < 0.05; ** p < 0.01; *** p < 0.001.

07

Marginal effect of inflation on the share of investment for energy efficiency (Models 1-3) and on the probability of investment in energy efficiency measures in 2022 (Models 4-5)

	Model 1	Model 2	Model 3
	All firms	SMEs	Large firms
Inflation rate, categorical (ref = low inflation: 0-5%)			
No inflation (0% or less)	-0.005 (0.006)	-0.001 (0.007)	-0.020 (0.013)
Moderate inflation (5-10%)	0.011 (0.008)	0.006 (0.008)	0.043* (0.021)
High inflation (10-20%)	0.009 (0.012)	0.009 (0.013)	-0.002 (0.035)
Very high inflation (>20%)	0.096** (0.037)	0.101* (0.040)	0.068 (0.090)
Cash reserves	0.014 (0.014)	-0.011 (0.014)	0.184*** (0.049)
Control variables	x	x	x
Country-fixed effects	x	x	x
Year-fixed effects	x	x	x
Num. Obs.	48,272	40,291	7,981

Note: marginal effects presented. Standard errors in parentheses. + p < 0.1; * p < 0.05; ** p < 0.01; *** p < 0.001.

08

Marginal effect of inflation and of cash reserves on the probability of undertaking more investment in the current financial year

	Model 1	Model 2	Model 3
	All firms	SMEs	Large firms
Inflation rate, categorical (ref = low inflation: 0-5%)			
No inflation (0% or less)	0.151*** (0.037)	0.140** (0.046)	0.240*** (0.069)
Moderate inflation (5-10%)	0.136** (0.047)	0.112* (0.055)	0.297** (0.104)
High inflation (10-20%)	0.321*** (0.085)	0.282** (0.100)	0.363+ (0.207)
Very high inflation (>20%)	1.203*** (0.174)	1.585*** (0.217)	0.778* (0.348)
Control variables	X	X	X
Country-fixed effects	X	X	X
Year-fixed effects	X	X	X
Num. Obs.	61,864	52,199	9,665
R-Squared	0.328	0.110	0.111

Note: marginal effects presented. Heteroscedasticity-consistent robust errors in parentheses. + p < 0.1; * p < 0.05; ** p < 0.01; *** p < 0.001.

09

Linear regression model for real log(investment) in the previous financial year as dependent variable