

Inflation expectations and earnings management in the euro area: evidence from business and consumer surveys

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Abstract

Purpose – This paper aims to examine the associations between inflation expectations and earnings management, accrual-based and real activities manipulation, using a sample of firms listed and incorporated in euro area countries.

Design/methodology/approach – Drawing on survey-based measures of inflation expectations, along with the models developed by Kothari *et al.* (2005) and Roychowdhury (2006) to estimate accrual and real earnings management, and a sample spanning from 2005Q1 – the year when most euro area countries adopted IFRS – to 2023Q4, the authors perform fixed-effects regressions.

Findings – The authors find that higher firms' inflation expectations are associated with greater accrual-based earnings management and real earnings management through overproduction, whereas sales manipulation exhibits a negative association. In addition, in recessionary periods, when there is a broad decline in economic activity, these relationships become more pronounced, with upward accrual-based earnings management and real earnings management through sales manipulation being particularly evident. Finally, when the effective lower bound (ELB) is binding, the positive relation between earnings management and inflation expectations generally weakens. Replicating the analysis using consumers' inflation expectations as the primary explanatory variable, the authors further find that downward accrual-based earnings management and overproduction are more prominent during recessions, whereas firms appear to rely on sales manipulation when the ELB is being approached.

Originality/value – To the best of the authors' knowledge, this is the first study to investigate the associations between inflation expectations and earnings management. The results of this study may have implications mainly for investors, auditors and central banks.

Keywords Earnings management, Inflation expectations, Euro area, Effective lower bound, Business cycle

Paper type Research paper



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1. Introduction

Rising inflation in recent years has revived both the academic and non-academic debate on how inflation affects corporate decision-making. For example, [Schwartzman and Ravindranath \(2022\)](#) report that in 2022, the percentage of US managers who responded that they do not follow inflation at all fell by about half from 21% to 11% in a six-month period. The outbreak of the COVID-19 pandemic was a shock for businesses and individuals, while the Russian–Ukrainian war that followed in combination with the energy crises delayed economic recovery and raised inflation rates among countries around the globe. For example, the euro area experienced a surge in inflation after a long period of low inflation from 2013 to 2020. These disturbances in price dynamics could change firms' expectations about the future and further affect accounting and operating strategies.

Inflation expectations are beliefs about the growth rate of prices in the future. Expectations of price movements play a key role in shaping economic agents' behavior, such as households' consumption, investors' choices and firms' pricing policies, capital expenditures and labor demand ([Fabiani et al., 2006](#); [Abaidoo, 2016](#); [Coibion et al., 2020a, 2020b](#); [Rondinelli and Zizza, 2020](#)), and can be transformed into actual inflation through their economic and financial decisions. Inflation can affect earnings numbers because of higher sales volatility and production costs. Moreover, uncertainty about the magnitude of central bank's intervention to control inflation, through contractionary monetary policy and rises in policy rates constitute an unfavorable environment for firms and individuals who have borrowed with different, possibly better, terms. The increase in the cost of debt and the risk of reporting lower earnings may exert pressure on managers and alter accounting and operating decisions.

This paper examines the associations between inflation expectations, formed by both firms and consumers, and accrual and real earnings management in the euro area. We find that higher firms' inflation expectations are associated with greater accrual-based earnings management and real activities manipulation through overproduction, while being negatively associated with sales manipulation. Even though we do not test channels directly, the results are consistent with incentives to meet analysts' forecasts ([Mindak et al., 2016](#)), support stock prices, avoid wage increases by understating performance, take "big bath" charges and build inventory in anticipation of higher demand. In addition, higher expected consumption because of concerns about purchasing power erosion may reduce managers' willingness to cut prices or offer more lenient credit terms to stimulate sales. Our results are further corroborated when we replicate the analysis using consumers' inflation expectations, which are formed in a manner similar to firms' inflation expectations.

Further analysis provides evidence that this relationship is state-dependent, as during recessions, when pessimism about economic and financial conditions is greater and expectations about future prices are higher, the association between inflation expectations and earnings management is stronger than in periods of expansion. Finally, when policy rates are cut and the effective lower bound (ELB) is binding – a period characterized by low inflation and subdued inflation expectations – we find that the positive relationship between inflation expectations and earnings management is generally weaker. This is consistent with the argument that, in this regime, managers' incentives to manage earnings, particularly for stock-market-related reasons, may be more constrained.

Our findings suggest that macroeconomic conditions shape not only expectations but also the extent to which such expectations translate into managerial reporting behavior. To the best of our knowledge, we are the first to examine the associations between inflation expectations and firms' earnings management. Two studies are closely related to ours. The study of [Isma et al. \(2023\)](#) examines the effects of inflation on firm value in Indonesia, showing that accounting quality can moderate the negative effects of inflation on firm value,

while the study of [Tamimi and Orban \(2020\)](#) provides evidence that hyperinflation leads to issuance of financial results in a misleading manner in Venezuela. However, our study differs in that we examine the association between inflation expectations and earnings management, with a focus on how these expectations relate to firms' incentives to engage in such practices. Moreover, we are among the first to study the associations between expectations about a macroeconomic indicator and financial reporting in euro area. Overall, our findings offer new empirical insights into how macroeconomic expectations are reflected in firms' reporting choices, thereby complementing existing theories on earnings management and managerial incentives. The remainder of this paper proceeds as follows. Section 2 reviews the relevant literature and develops the testable hypothesis. Section 3 describes our research methodology and sample. Section 4 presents the empirical results and further analysis. Section 5 concludes this study.

2. Literature review and hypotheses development

Although inflation expectations are typically analyzed at the macroeconomic level, they are formed at the microeconomic level and ultimately affect economic outcomes through individual household and firm decisions. Inflation expectations influence price, wage setting and – via expected real interest rates – consumption, investment, borrowing and saving. Households' inflation expectations determine consumption, via both intertemporal substitution and income effects. According to the intertemporal substitution effect, higher future inflation expectations are associated with lower real interest rates, which lead to current consumption's stimulation. In contrast, the income effect implies that if higher inflation is perceived as deterioration in economic conditions, then households may increase precautionary savings and reduce consumption. Empirical evidence for euro area households indicates that higher inflation expectations are often associated with higher consumption, consistent with intertemporal substitution ([Arioli et al., 2017](#); [Duca et al., 2021](#)). [D'Acunto et al. \(2016\)](#) also report that German households are more willing to spend on durable goods and less motivated to save when they expect an increase in inflation.

Households in advanced economies tend to associate inflation-related news with a deterioration in overall economic conditions, which leads them to raise their inflation perceptions or expectations ([Candia et al., 2020](#)). Consistently, inflation expectations are higher when consumers are pessimistic about the economic and financial outlook ([Ehrmann et al., 2017](#); [Cecchetti et al., 2021](#)), a pattern observed during periods such as the COVID-19 pandemic and the Great Recession.

Firms' inflation expectations are shaped by several factors, including their understanding of news on current inflation, as well as developments in wages and input prices. The monetary policy stance and its communication through forward guidance also play a key role, linking macroeconomic policy intentions to firms' micro-level expectations and decision-making processes.

Inflation may further affect financial reporting, as it could undermine the reliability of financial statements prepared under historical cost accounting. As inflation accounting is not universally applied and the restatement of financial statements is usually not required [1], stakeholders' ability to assess company's profitability, liquidity and solvency is limited. [Modigliani and Cohn \(1979\)](#) show that investors do not succeed in incorporating inflation on nominal earnings, while their ability to predict future cash flows and value stocks is impaired ([Konchitchki, 2011](#)). The difficulty to assess market prices may prompt investors to sell their assets, leading to further declines in stock prices and firm value. Complementarily, [Fama and Schwert \(1977\)](#) find that stock returns are negatively correlated with both components of inflation, expected and unexpected.

Firms may formulate their operating strategies based on their expectations, which determine their economic behavior and, in turn, pricing, investment and employment decisions (Coibion *et al.*, 2020a; Asghar *et al.*, 2023). Experimental evidence shows that firms expecting higher inflation tend to increase prices while reducing employment and investment, reflecting managerial perceptions that high inflation is associated with overall negative economic conditions (Coibion *et al.*, 2020b). The belief that inflation will rise leads to increase in macroeconomic uncertainty and in uncertainty about firms' operating results. The foreseen rise of prices of raw materials will increase firms' total cost, and at the same time, as the corresponding rise of product prices delays, companies will face the risk of reporting lower earnings (Zou, 2019). Moreover, as their purchasing power is reduced, employees, through their unions will negotiate higher wages, which will affect firms' financial planning. In addition, if inflation is expected to rise, then the cost of debt is also likely to increase, as central banks will raise policy rates, leading to higher interest expenses, less favorable borrowing terms [2], reduced profits, potential debt covenant breaches, declining stock prices [3] and lower valuations. These reasons may alter firms' accounting policies and ultimately affect financial reporting quality.

Previous studies suggest that accounting practices, such as earnings management, are sensitive to the economic environment in which firms operate (Arnold, 2009; Filip and Raffournier, 2014; Flores *et al.*, 2016; Kumar and Vij, 2017; Assenso-Okofu *et al.*, 2020). Earnings management is one of the commonly used methods through which firms communicate a desired financial position (Mansoori and Al-Abdallah, 2024), influence stock prices (Healy and Wahlen, 1999; Jensen, 2005), secure more favorable borrowing terms, avoid the renegotiation of compensation contracts (Bowen *et al.*, 1995) or shift performance across periods (e.g. through "big bath" strategies). Earnings management could reflect the transmission of macroeconomic expectations into firms' micro-level accounting decisions. Macroeconomic expectations may influence reporting choices by not only altering underlying economic conditions but also affecting managerial incentives and the degree of reporting flexibility. In this sense, the literature suggests that earnings management is shaped by both incentive-driven motives and the level of uncertainty surrounding firms' operating environment. However, most existing studies focus on realized macroeconomic conditions, leaving the role of forward-looking expectations relatively underexplored.

The aim of this study is to present how expectations about inflation motivate managers to manipulate earnings in the euro area. Earnings can be managed primarily using accounting techniques and accruals adjustments (accrual-based earnings management) and altering of firms' operating decisions, a practice known as real earnings management, which is less sensitive to accounting regulations and standards.

2.1 Accrual-based earnings management

Inflation uncertainty is a source of economic policy uncertainty (Ball, 1992; Istiak and Alam, 2019), whose effects on earnings management remain mixed (Yung and Root, 2019; Jin *et al.*, 2019; El Ghoul *et al.*, 2021; Cui *et al.*, 2021; Kim and Yasuda, 2021). For example, during periods of high inflation, estimates related to provisions, impairments and depreciation methods may be revised to more accurately reflect prevailing economic conditions. However, managerial judgement may be exercised in ways that align with specific reporting objectives. This judgement is affected by company's net monetary position, which is the difference between monetary assets (e.g. cash and accounts receivable) and monetary liabilities (e.g. accounts payable) and determines the direction of the potential manipulation.

On the one hand, in periods of macroeconomic uncertainty and according to agency theory, managers may adjust financial strategies to mitigate perceived risks, maintain market confidence and avoid debt covenant violations, even though high inflation may trigger debt renegotiation and changes in credit conditions. For example, [Cho and Patil \(2024\)](#) find that macroeconomic uncertainty exacerbates informational asymmetry and enables managers to engage in income-increasing earnings management to impress investors. Inflation can cause a decrease in market capitalization and lower demand for shares by investors. As compensation is closely tied to stock prices, managers want to avoid stock price falls. Thus, when expectations about inflation are increased, managers may engage in upward earnings management to meet or beat earnings targets, maintain stability in investors' and creditors' perception and prevent sharp drops in share prices.

On the other hand, [Simpson \(2013\)](#) argues that managers overstate earnings in periods when investor sentiment is high, but report relatively conservatively in periods when investor sentiment is lower. As periods of high inflation are perceived negatively by investors, earnings management could be restricted. Furthermore, managers may even engage in downward earnings management. Under the political cost hypothesis [Watts and Zimmerman \(1978\)](#), managers may adopt accounting practices that depress reported earnings in an effort to mitigate potential political scrutiny arising from high profitability, a practice that could become particularly common during periods of macroeconomic control ([Chen et al., 2011](#)), such as those of high inflation.

Incentives for downward earnings management may be reinforced by employees' expectations of declining purchasing power, which may increase pressure to renegotiate compensation contracts. Higher wages would raise labor costs and, holding prices constant, will reduce reported earnings. Alternatively, if firms increase prices, then this may intensify workers' demands for further wage adjustments, contributing to a price–wage spiral characterized by sustained price increases and potentially adverse outcomes for firms if consumers are unwilling to absorb higher prices. Finally, to the extent that high inflation is associated with negative economic conditions, managers, who anticipate poor future performance, can manage earnings downwards, by “taking a bath” to present better results in the future. For example, [Rigamonti et al. \(2024\)](#) provide evidence that commodity firms engage in income-decreasing earnings management in response to macroeconomic uncertainty to shift earnings from uncertain to more certain periods and maximize equity value, while accounting for both observed and expected volatility. Therefore, we hypothesize that:

H1. Higher inflation expectations are associated with firms' accrual-based earnings management.

2.2 Real earnings management

Managers can also manage earnings by altering operating activities. The concept of using real earnings management is the same as using accruals, which is to focus on current earnings targets. However, these practices could have negative consequences for firms' future economic performance ([Sitanggang et al., 2020](#)). The boost of production more than necessary spreads fixed overhead costs over a larger number of units, lowering fixed costs per unit (manipulation through overproduction). Moreover, managers can manipulate earnings through accelerating the timing of sales by offering price discounts and more lenient credit terms (sales manipulation). This will temporarily increase sales volume, but these gains will disappear when firms return to their previous pricing policy. This economic decision will result in lower cash flows from operations in the current period. Finally, managers can manage and increase current earnings through cuts in discretionary expenses

such as advertising, research and development, selling, general and administrative expenses (abnormal cut in discretionary expenses). At the same time, managers can also manipulate current period cash flows at the expense of future cash flows if these expenses are paid by cash. Because of limited availability of data, we test real earnings management using the first two proxies.

Based on the intertemporal substitution effect and the findings of [D'Acunto et al. \(2016\)](#), [Arioli et al. \(2017\)](#) and [Duca et al. \(2021\)](#), who show that in the euro area, higher inflation expectations lead to consumption stimulation, we hypothesize that firms will not try to increase their earnings using price discounts or the provision of better credit terms. Households' perceptions about current lower prices will lead to a rise in demand for goods and services, as they seek to benefit from prevailing price levels and increase their stock. This demand-driven rise in sales will reduce firms' incentives to artificially inflate earnings. Thus, our second hypothesis is summarized as follows:

H2. Higher inflation expectations are associated with a reduction in earnings management through sales manipulation.

If firms expect higher inflation, then they may increase current production to take advantage of relatively lower input costs (raw materials, wages, etc.) and sell output at higher future prices. This forward-looking behavior can improve current reported margins and smooth earnings, which is generally valued by investors. Prior research shows that higher inflation expectations lead firms to raise their output prices in advance, by more than the expected increase in input prices ([Coibion et al., 2020a, 2020b](#); [Asghar et al., 2023](#)). [Ragnitz \(2022\)](#) and [Weber and Wasner \(2023\)](#) provide evidence that supply-chain bottlenecks and sector-wide cost shocks, such as energy crises, may create temporary monopoly power and opportunities for price increases to not only protect profits but also increase them, as consumers are more willing to pay higher legitimate prices. Price increases are inevitable because firms face adjustment costs and, therefore, change prices infrequently, setting them in a forward-looking manner that reflects current conditions, expected future costs and demand, as well as competitors' strategies. The hesitation to raise prices is often interpreted by analysts as a negative signal particularly in contexts where competitors are anticipated to adjust prices upward ([Weber and Wasner, 2023](#)). Elevated production and increased inventory levels raise the risk of obsolescence and spoilage; however, these costs may be outweighed by the benefits of improved current performance and the capacity to satisfy stronger demand. Maintaining adequate inventories is particularly important when households, driven by elevated inflation expectations, increase spending, as insufficient stock may prompt customers to switch to competitors, resulting in a loss of market share. Therefore, our hypothesis is formulated as follows:

H3. Higher inflation expectations are associated with higher levels of earnings management through overproduction.

3. Data and methodology

We focus on euro area countries as they share a common monetary policy implemented by the European Central Bank (ECB), which is responsible for maintaining price stability, defined as an annual inflation rate at 2%. To accomplish this goal, the ECB tries to anchor medium and long-term inflation expectations around that level. Thus, to a considerable extent, euro area countries exhibit relatively homogeneous inflation expectations.

Quarterly accounting data are retrieved from Refinitiv Eikon. Our sample spans from 2005Q1, year of IFRS adoption by most European countries to 2023Q4. For a firm to be included, we require that it is listed on the stock exchange of one of the euro area countries (Austria, Belgium, Cyprus, Estonia, France, Finland, Germany, Greece, Ireland, Italy, Malta, Luxembourg, the Netherlands, Portugal, Slovenia, Slovakia and Spain) and headquartered in the same country.

To measure accrual-based earnings management, we use the model introduced by [Kothari et al. \(2005\)](#) estimated cross-sectionally for every industry and quarter:

$$TACC_{i,t}/TA_{i,t-1} = \beta_1 (1/TA_{i,t-1}) + \beta_2 (SALES_{i,t}/TA_{i,t-1}) + \beta_3 (\Delta SALES_{i,t} - \Delta REC_{i,t}/TA_{i,t-1}) + \beta_4 (PPE_{i,t}/TA_{i,t-1}) + \beta_5 ROA_{i,t} + \varepsilon_{i,t} \quad (1)$$

where for firm i in quarter t , $TACC$ is the Total Accruals estimated using the balance sheet approach [$TACC = (\text{Change in Current Assets} - \text{Change in Cash and Short-term investments}) - (\text{Change in Current Liabilities} - \text{Change in Short term Debt in current Liabilities}) - \text{Depreciation and Amortization}$], AT_{t-1} is Total Assets in quarter $t - 1$, $\Delta SALES$ = change in net sales from quarter $t - 1$ to t , ΔREC is change in Receivables (Total) from quarter $t - 1$ to t , PPE is Gross Property Plant and Equipment in quarter t , ROA is Return on Assets and ε is the random error term.

The residuals from the estimation of [equation \(1\)](#) are the discretionary accruals (DA), which capture the extent of accrual-based earnings management. In our models, we use the signed discretionary accruals to distinguish between income-increasing and income-decreasing manipulation. Specifically, positive discretionary accruals ($POS DA$) indicate greater income-increasing earnings management, whereas negative discretionary accruals indicate greater income-decreasing earnings management [\[4\]](#).

As in [Roychowdhury \(2006\)](#) [\[5\]](#), we examine sales manipulation which results in abnormal cash flows from operations ($ABNCFO$), using the following regression model estimated cross-sectionally for every industry and quarter:

$$CFO_{i,t}/AT_{i,t-1} = \beta_0 + \beta_1 (1/AT_{i,t-1}) + \beta_2 (SALES_{i,t}/AT_{i,t-1}) + \beta_3 (\Delta SALES_{i,t}/AT_{i,t-1}) + \varepsilon_{i,t} \quad (2)$$

where CFO represents cash flows from operations, $SALES$ is measured on a quarterly basis and all other variables are as previously described. $ABNCFO$ is defined as the residuals from [equation \(2\)](#). As lower than normal operating cash flows correspond to higher sales manipulation, these residuals are multiplied by -1 , so that higher $ABNCFO$ values indicate greater real earnings management.

To estimate abnormal production costs ($ABNPROD$), we use the following regression model estimated cross-sectionally for every industry and quarter:

$$PROD_{i,t}/AT_{i,t-1} = \beta_0 + \beta_1 (1/AT_{i,t-1}) + \beta_2 (SALES_{i,t}/AT_{i,t-1}) + \beta_3 (\Delta SALES_{i,t}/AT_{i,t-1}) + \beta_4 (\Delta SALES_{i,t-1}/AT_{i,t-1}) + \varepsilon_{i,t} \quad (3)$$

In [equation \(3\)](#), $PROD$ is measured as the sum of quarterly cost of goods sold ($COGS$) and the change in inventory (ΔINV), with all other variables defined as previously described. $ABNPROD$ is measured as the residuals from [equation \(3\)](#).

3.1 Measuring inflation expectations

Inflation expectations are tracked through survey-based and market-based measures. Measures of expectations based on surveys capture consumers' and businesses' assessments of inflation and their uncertainty regarding price developments. For the euro area, the consumer and business survey carried out by the European Commission collects data about inflation expectations of firms and households at various time horizons per country. In comparison, market-based indicators reflect the investors' perceptions about inflation. In the euro area, data on both inflation swap contracts and options are available; however, as measures, they are influenced by trading and liquidity factors (Reis, 2023). Among the surveys-based metrics, special attention is given to the Survey of Professional Forecasters (SPF), which is based on the inflation projections, over the short- and long-term horizon, provided by financial or non-financial institutions experts for the euro area as a whole.

The factors that drive households' and firms' expectations are different from those of professional forecasters. Although households' and firms' expectations are updated more slowly (Carroll, 2003) and household surveys do not differentiate between "informed" and "uninformed" consumers, whose responses may be biased by increases in particular products that they buy frequently (e.g. food and gas) (Coibion and Gorodnichenko, 2015; Sousa and Yetman, 2016; Coibion et al., 2018), they include a large number of different respondents, offering greater diversity and representativeness of economic agents. Moreover, surveys of professional forecasters are sometimes influenced by the strategic behavior of the respondents, who want to have predictions close to others' and at the same time they want to differentiate to signal that they possess private information. Finally, communication with policymakers in conferences leads them to share converging perceptions (Reis, 2023).

In this study, we focus on survey-based expectations of firms and consumers, as prior research documents that these estimates provide useful information about inflation expectations (Basselier et al., 2018) and are more precise than those derived from professional forecasters or complex econometric models (Ang et al., 2007; Álvarez and Correa-López, 2020; Binz et al., 2023). Finally, these measures are the most appropriate proxies to test the associations between inflation expectations and firms' accounting and operating decisions. Our measures of inflation expectations are obtained from the European Commission's Business and Consumer surveys and reflect aggregated country-level data. Consumers are asked about their expectations for consumer price developments over the next twelve months, while firms in the construction (building), industry (manufacturing), retail and services sectors [6] are surveyed about their expected selling price developments over the next three months. The survey questions and answer options are provided in Appendix. The main variable of interest is the balance statistic at the country and sector level, which captures the difference between the share of respondents expecting prices to "increase" and those expecting them to "decrease."

The balance statistic is calculated as the difference between the relative frequencies of responses falling in different categories. Answers are weighted using a scheme that assigns to the answers [1] and [5] twice the weight of the moderate responses [2] and [4]; the middle response [3] and the "don't know" response [6] receive zero weights (Arioli et al., 2017). The balance statistic is, thus, computed as:

$$B = P[1] + \frac{1}{2}P[2] - \frac{1}{2}P[4] - P[5]$$

where $P[i]$ is the frequency of response $[i]$ ($i = 1, 2, \dots, 6$). The balance statistic ranges between -100 and $+100$. Given the qualitative nature of the questions, we obtain evidence

about the direction of inflation expectations but not a specific expected or perceived inflation rate.

Starting with firms' inflation expectations, to test *H2* and *H3* (hypotheses about real earnings management techniques) and as real earnings management has to be conducted throughout the accounting period (e.g. it is unlikely that a firm will increase production or provide discounts during the last days of the quarter to beat earnings benchmarks), we take as a proxy for inflation expectations, the standardized arithmetic average of monthly balance statistic within a quarter per country. Conversely, decisions about accrual earnings management can be made after the end of accounting period and before the issuance of financial statements. Therefore, as a proxy for inflation expectations to test *H1*, we use the standardized balance statistic of the last month of the quarter (March, June, September and December) per country. Our main variables of interest are *REALINFLEXP* and *ACCINFLEXP*, respectively.

3.2 Control variables

Prior research documents that earnings management is affected by factors such as financial leverage, growth, size and profitability. *LEV* is included as a control variable to account for debt-contracting incentives for earnings management. Highly leveraged firms may engage in both upward and downward earnings management (DeFond and Jiambalvo, 1994; Peasnell et al., 2005). However, lenders may monitor firms' reporting practices and operations more closely, thereby constraining earnings management. *SALESGR* is included to control for the impact of growth on earnings management. Managers may seek to convince investors of their stable growth; thus, they may use income-increasing earnings management when growth slows (Summers and Sweeney, 1998). The natural logarithm of Total Assets is included to account for the effect of firm size. Larger firms may face greater reputational and political costs than smaller ones after earnings management because of more analyst following and investor and auditor scrutiny; therefore, they may reduce their earnings management practices. However, the complexity of larger firms facilitates earnings manipulation because it is more difficult for stakeholders to reveal it. *LOSS* and *ROA* are included to control for profitability. Firms reporting losses are likely to have managed earnings upwards to report a smaller loss. Moreover, if earnings are below estimates and losses are inevitable, then they may manage earnings downwards to easily achieve future earnings benchmarks. *LOSS* is a dummy variable taking the value 1 if current-quarter net income is negative and 0 otherwise. Finally, *ROA* is included to control for the impact of firm performance on earnings management (Kothari et al., 2005).

To test *H1*, *H2* and *H3*, we estimate the following model:

$$EM_{it} = \alpha_0 + \beta_1 FIRMINFLEXP_{it} + \beta_2 LEV_{it} + \beta_3 SALESGR_{it} + \beta_4 SIZE_{it} + \beta_5 LOSS_{it} + \beta_6 ROA_{it} + quarterFE + industryFE + countryFE + \varepsilon_{it} \quad (4)$$

where *EM* represents the earnings management measures. For accrual-based earnings management, we use signed discretionary accruals (*DA*) (*POSDA* and *NEGDA*) estimated from equation (1) and for real earnings management we use *ABNCFO* and *ABNPROD* estimated from equations (2) and (3). Variable definitions are presented in Table 1. The regressions include quarter, industry and country fixed effects and standard errors are clustered at the firm level. *FIRMINFLEXP* corresponds to either *REALINFLEXP* and *ACCINFLEXP*, depending on the specification. Tables 2 and 3 present summary statistics and Pearson correlations.

Table 1. Variables definition

Variables	Definitions
DA	Signed Discretionary Accruals (Positive POSDA and Negative NEGDA) based on the Kothari <i>et al.</i> model (2005) to proxy Accrual Earnings Management
ABNCFQ	Abnormal Cash Flow from Operations based on Roychowdhury (2006)
ABNPROD	Abnormal Production Costs based on Roychowdhury (2006)
FIRMINFLEXP	Firm inflation expectations
CONSINFLEXP	Consumer inflation expectations
ACCINFLEXP	The standardized balance statistic of the last month of the quarter (March, June, September and December) per country derived from Questions 6 [services, retail, industry (manufacturing)] and 5 [building (construction)] of Consumer and Business Survey of European Commission
REALINFLEXP	The standardized arithmetic average of monthly balance statistic within a quarter per country derived from Questions 6 [services, retail, industry (manufacturing)] and 5 [building (construction)] of Consumer and Business Survey of European Commission
CONSACCINFLEXP	The standardized balance statistic of the last month of the quarter (March, June, September and December) per country derived from Question 6 (consumers) of Consumer and Business Survey of European Commission
CONSREALINFLEXP	The standardized arithmetic average of monthly balance statistic within a quarter per country derived from Question 6 (consumers) of Consumer and Business Survey of European Commission
LEV	(Long term debt)/total assets
SALESGR	(Change in sales)/lagged sales
ROA	(Net income)/total assets
SIZE	Natural logarithm of total assets
LOSS	A dummy variable, taking the value 1 if current quarter's net income is negative and 0 otherwise is included
ELB	A dummy variable taking the value 1 from 2012Q3 to 2022Q3 and 0 otherwise
ECBSU/RP	The sum of changes in the three-month Overnight Indexed Swaps (OIS 3 m) following monthly ECB policy meeting
Note(s): This table presents the definition of variables used in this study	
Source(s): Authors' own work	

Table 2. Summary statistics

Variables	Mean	SD	Median	N
<i>DA</i>	0.000	0.040	0.000	72,064
<i>ABNCFO</i>	0.000	0.074	0.000	69,196
<i>ABNPROD</i>	0.000	0.053	0.002	63,553
<i>REALINFLEXP</i>	-0.009	1.002	-0.155	72,064
<i>ACCINFLEXP</i>	-0.008	1.007	-0.175	72,064
<i>CONSREALINFLEXP</i>	-0.024	0.993	0.014	72,064
<i>CONSACCINFLEXP</i>	-0.026	0.998	0.030	72,064
<i>LEV</i>	0.170	0.142	0.140	72,064
<i>ROA</i>	-0.001	0.038	0.006	72,064
<i>SALESGR</i>	0.035	0.277	0.000	72,064
<i>SIZE</i>	5.597	2.121	5.342	72,064
<i>LOSS</i>	0.326	0.469	0.000	72,064

Note(s): This table reports summary statistics for variables used in this study. Definition and measurement of variables are presented in [Table 1](#)

Source(s): Authors' own work

4. Empirical results

Panels A and B of [Table 4](#) report multivariate regression results for *H1*, *H2* and *H3*. The coefficients of *ACCINFLEXP* and *REALINFLEXP* are positive and statistically significant at the 1% level when our earnings management proxy is the positive discretionary accruals *POSDA* estimated with the performance-matched discretionary accruals of [Kothari et al. \(2005\)](#) and positive and statistically significant at 5% level when we use as dependent variable the *ABNPROD* estimated as in [Roychowdhury \(2006\)](#). These results indicate that firms' inflation expectations are positively associated with upward accrual earnings management, providing evidence for the direction of *H1*. Real earnings management through overproduction is also higher, when inflation expectations rise, which is in line with our *H3*, while the statistically insignificant coefficient of *ABNCFO* leads us to fail to reject *H2*. Although we do not directly test the underlying channels through which this happens, our results are consistent with several behavioral mechanisms through which inflation expectations shape managerial decision-making. Elevated inflation expectations likely increase perceived macroeconomic uncertainty and anticipated cost pressures, which heighten managers' concerns about maintaining performance benchmarks such as analysts' forecasts and stock price levels. In response, managers may become more inclined to engage in upward accrual-based earnings management to smooth reported earnings and mitigate potential negative market reactions. At the same time, higher inflation expectations may affect managers' beliefs about future demand and pricing conditions. In anticipation of higher prices and future demand driven by elevated expected consumption, managers may increase current production and accumulate inventory, both to meet higher expected demand and reduce reported costs through fixed-cost absorption, thereby contributing to real earnings management via overproduction. As far as the control variables are concerned, *LEV* is positively associated with income-increasing accrual earnings management and real earnings management through sales manipulation, while being negatively associated with income-decreasing accrual earnings management and manipulation through overproduction. *SALESGR* is positively associated with both types of earnings management, while *SIZE* is negatively associated with both income-increasing and income-decreasing accrual earnings management and sales manipulation, but positively associated with manipulation through

Table 3. Pearson correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) <i>DA</i>	1.000											
(2) <i>ABNCFD</i>	0.176***	1.000										
(3) <i>ABNPROD</i>	0.111***	0.187***	1.000									
(4) <i>REALINFLEXP</i>	-0.001	-0.005	-0.017***	1.000								
(5) <i>ACCINFLEXP</i>	-0.001	-0.006	-0.015***	0.969***	1.000							
(6) <i>CONREALINFLEXP</i>	-0.003	0.016***	-0.047***	0.498***	0.494***	1.000						
(7) <i>CONSACCINFLEXP</i>	-0.004	0.016***	-0.046***	0.491***	0.499***	0.966***	1.000					
(8) <i>LEV</i>	0.024***	0.078***	0.006	0.034***	0.036***	-0.025***	-0.025***	1.000				
(9) <i>ROA</i>	0.000	-0.439***	-0.143***	0.041***	0.040***	0.022***	0.026***	-0.176***	1.000			
(10) <i>SALESGR</i>	0.129***	0.015***	0.013***	0.023***	0.030***	0.012***	0.018***	0.000	0.080***	1.000		
(11) <i>SIZE</i>	-0.011***	-0.209***	0.001	0.035***	0.030***	0.059***	0.057***	0.103***	0.252***	-0.017***	1.000	
(12) <i>LOSS</i>	-0.014***	0.278***	0.106***	-0.079***	-0.077***	-0.070***	-0.072***	0.109***	-0.606***	-0.095***	-0.276***	1.000

Note(s): This table presents the Pearson correlation coefficients among the variables used in the main tests. Refer to Table 1 for definition and measurement of variables. *, **, and *** denote significance at the 10, 5 and 1% levels, respectively

Source(s): Authors' own work

Table 4. The association between firms' inflation expectations and earnings management (accrual-based and real)

Variables	<i>POSDA</i>	<i>NEGDA</i>
<i>Panel A</i>		
<i>ACCINFLEXP</i>	0.000793*** (2.683)	-0.000202 (-0.571)
<i>LEV</i>	0.00390** (2.168)	-0.00933*** (-5.172)
<i>SALESGR</i>	0.0180*** (16.17)	0.00333*** (3.147)
<i>SIZE</i>	-0.00189*** (-12.14)	-0.00145*** (-9.183)
<i>LOSS</i>	0.000183 (0.451)	0.00407*** (8.911)
Constant	0.0551*** (15.60)	0.0513*** (14.69)
Observations	36,309	35,755
Number of firms	2,170	2,169
Degrees of freedom	36,186	35,632
Country FE	Yes	Yes
Quarter FE	Yes	Yes
Industry FE	Yes	Yes
R^2 within	0.1182	0.089
R^2 between	0.2132	0.2094
<i>Panel B</i>		
Variables	<i>ABNCFO</i>	<i>ABNPROD</i>
<i>REALINFLEXP</i>	0.000824 (1.321)	0.00137** (2.469)
<i>LEV</i>	0.0274*** (4.711)	-0.00990*** (-3.324)
<i>ROA</i>	-0.481*** (-18.34)	-0.153*** (-10.22)
<i>SALESGR</i>	0.00770*** (5.898)	0.00270** (2.214)
<i>SIZE</i>	-0.00852*** (-9.812)	0.00358*** (5.027)
<i>LOSS</i>	0.000736 (0.675)	0.00186** (2.537)
Constant	0.0626*** (6.226)	-0.0130 (-1.220)
Observations	69,196	63,553
Number of firms	2,208	2,021
Degrees of freedom	69,072	63,430
Country FE	Yes	Yes
Quarter FE	Yes	Yes
Industry FE	Yes	Yes
R^2 within	0.0570	0.0140
R^2 between	0.4084	0.0636

Note(s): This table presents the regression results on the association between firms' inflation expectations and earnings management (accrual-based and real). Z-statistics reported in parentheses are based on standard errors clustered by firm. The extreme values of all continuous variables are winsorized at the 1st and 99th percentiles. Definition and measurement of variables are presented in Table 1. *, ** and *** denote significance at the 10, 5 and 1% levels, respectively. All predictor variables were assessed for multicollinearity. Variance inflation factor (VIF) values are below 5, indicating no significant multicollinearity

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overproduction, which is consistent with prior mixed findings regarding firm size and earnings management. *ROA* is negative and statistically significant at the 1% level when overproduction and sales manipulation are the dependent variables. Finally, *LOSS* is positively associated with negative discretionary accruals and overproduction.

4.1 Addressing endogeneity

Endogeneity could be a concern in our analysis. To address this issue, we use an Instrumental Variable (IV) approach. As an instrument, we use the ECB monetary policy surprises

(*ECBSURP*) measured as the sum of changes in three-month Overnight Indexed Swaps (OIS 3 m) following monthly ECB policy meetings. The data are drawn from the euro Area Monetary Policy Event-Study Database (EA-MPD) developed by [Altavilla et al. \(2019\)](#). [Table 5](#) reports the results of the second-stage regressions from the two-stage least squares (2SLS) framework. The high values of the Kleibergen–Paap rk Wald F-Statistic across all specifications show that *ECBSURP* is a strong and valid instrument. The endogeneity tests yield *p*-values below 0.05 in the *POSDA*, *NEGDA* and *ABNCFO* regressions, suggesting that endogeneity may be present in these cases. With respect to *ACCINFLEXP*, IV estimates remain positive and statistically significant in the *POSDA* regression. In the *NEGDA* specification, they also become positive and statistically significant, which may reflect firms' intentions to report worse results to avoid increasing employees' compensation or to engage in a "big bath" strategy. Moreover, *REALINFLEXP* turns negative and statistically significant in the *ABNCFO* regression. Given that IV estimates provide a more reliable measure of the relationship, we conclude that an increase in inflation expectations is associated with higher accrual-based earnings management (upward and downward) providing clearer evidence about the direction of *H1* and lower levels of sales manipulation, as a method of real earnings management supporting *H2*. Finally, regarding overproduction, endogeneity does not appear to be a major concern in the *ABNPROD* regression (*p*-value 0.4749), indicating that our baseline results about *H3* are robust. The differential associations across earnings management proxies suggest that managers actively substitute between alternative tools under changing macroeconomic expectations. Moreover, while the mechanisms linking inflation expectations to accrual-based earnings management and real earnings management via overproduction have been discussed, the negative association with sales manipulation is consistent with a complementary demand-driven behavioral mechanism. When inflation expectations rise, managers anticipate stronger near-term consumption as households bring purchases forward to avoid higher future prices. This expectation of higher demand reduces the need to rely on artificial sales-boosting strategies such as price discounts or more lenient credit terms. From a managerial perspective, such practices become less attractive because they entail immediate cash flow and liquidity distortions and may signal underlying weakness if demand is already expected to be strong. For the average firm in our sample, with total assets of €2.531bn, a one-standard-deviation increase in inflation expectations is associated with economically meaningful changes in earnings management. Specifically, positive and negative discretionary accruals are higher by approximately €36.446m ($2,531,000,000 \times 0.0144$) and €31.384m ($2,531,000,000 \times 0.0124$), respectively, consistent with greater accrual-based manipulation. At the same time, abnormal production costs are higher by roughly €3.47m ($2,531,000,000 \times 0.00137$), while sales manipulation is lower by about €13.262m [$2,531,000,000 \times (-0.00524)$]. These associations are substantial enough to be relevant for financial reporting, production decisions and investor assessments, highlighting the practical significance of inflation expectations for both accrual and real earnings management.

4.2 Further analysis

4.2.1 The impact of the business cycle. [Arioli et al. \(2017\)](#) suggest that consumers' perceptions and expectations could be influenced by the phase of the business cycle in which the economy is or by the level of actual inflation and they find that they overestimate inflation during recessionary periods. From an agency perspective, during recessions, firms face declining revenues, credit constraints and greater scrutiny. These conditions place additional pressure on managers, who try to protect their own interests, deepening their gap with shareholders. Moreover, higher inflation expectations contribute to heightened uncertainty

Table 5. Second-stage IV estimates of the association between firms' inflation expectations and earnings management (accrual-based and real)

Variables	<i>POSDA</i>	<i>NEGDA</i>
<i>Panel A</i>		
<i>ACCINFLEXP</i>	0.0144*** (7.962)	0.0124*** (7.771)
<i>LEV</i>	−0.00349* (−1.662)	−0.0171*** (−8.366)
<i>SALESGR</i>	0.0171*** (14.46)	−0.000232 (−0.197)
<i>SIZE</i>	−0.00166*** (−11.47)	−0.00112*** (−8.127)
<i>LOSS</i>	0.00237*** (4.306)	0.00690*** (11.51)
Constant	0.0353*** (11.63)	0.0318*** (13.36)
Observations	36,309	35,755
Number of firms	2,170	2,169
Degrees of freedom	36,259	35,705
Country FE	Yes	Yes
Quarter FE	No	No
Industry FE	Yes	Yes
Kleibergen–Paap rk Wald F statistic	474.80	570.63
Endogeneity <i>p</i> -value	0.00	0.00
<i>R</i> ²	0.3163	0.3425
<i>Panel B</i>		
Variables	<i>ABNCFO</i>	<i>ABNPROD</i>
<i>REALINFLEXP</i>	−0.00524*** (−2.588)	−0.00113 (−0.607)
<i>LEV</i>	0.0105* (1.653)	−0.0102* (−2.108)
<i>ROA</i>	−0.826*** (−23.89)	−0.230*** (−9.432)
<i>SALESGR</i>	0.0135*** (8.818)	0.00572*** (4.231)
<i>SIZE</i>	−0.00471*** (−9.711)	0.00238*** (5.101)
<i>LOSS</i>	−0.000363 (−0.239)	0.00362*** (2.754)
Constant	0.0333*** (3.680)	−0.0203** (−2.055)
Observations	69,196	63,553
Number of firms	2,208	2,021
Degrees of freedom	69,145	63,502
Country FE	Yes	Yes
Quarter FE	No	No
Industry FE	Yes	Yes
Kleibergen–Paap rk Wald F statistic	1,812.73	1,993.36
Endogeneity <i>p</i> -value	0.0006	0.4749
<i>R</i> ²	0.2175	0.0574

Note(s): This table presents the second stage regression results on the association between firms' inflation expectations and earnings management (accrual-based and real). The Instrumental Variable used is the surprises of the ECB (*ECBSURP*). Z-statistics reported in parentheses are based on standard errors clustered by firm. The extreme values of all continuous variables are winsorized at the 1st and 99th percentiles. Definition and measurement of variables are presented in Table 1. *, ** and *** denote significance at the 10, 5 and 1% levels, respectively. All predictor variables were assessed for multicollinearity and quarter fixed effects were excluded. Variance inflation factor (VIF) values for the remaining variables are below 5, indicating no significant multicollinearity

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regarding future economic conditions, thereby broadening the range of plausible accounting estimates, particularly in areas such as cost projections, provisions and revenue recognition. This environment justifies the use of more aggressive financial reporting practices which are expected to be especially pronounced during periods of economic downturn, when managerial incentives to engage in earnings management are typically intensified. Taken together, we test the following hypothesis:

H4. The association between inflation expectations and earnings management is stronger during recessionary periods.

To examine this hypothesis, we considered six intervals of time based on the chronology of recessions and expansions established by the euro Area Business Cycle Dating Committee of the Centre for Economic Policy Research (CEPR) [7]. In the euro area, since January 2005 (sample start), there have been three expansion periods: 2005Q1–2008Q1, 2009Q3–2011Q3 and 2013Q2–2019Q4; and three recession periods 2008Q2–2009Q2, 2011Q4–2013Q1 and 2020Q1–2020Q2.

Panels A and B of Table 6 present the results when we estimate Model (4) separately for expansionary and recessionary periods. We find that the coefficient of *ACCINFLEXP* is greater and statistically significant during periods of recession, when *POSDA* is our dependent variable, while in expansionary periods, *ACCINFLEXP* is negative and statistically significant, when as dependent variable we have negative discretionary accruals *NEGDA*. Thus, *H4* is supported for accrual earnings management. This result suggests that in economic downturns, when pessimism about economic and financial conditions is higher and expectations about future prices are increased (Ehrmann *et al.*, 2017; Cecchetti *et al.*, 2021), firms tend to exhibit higher levels of upward earnings management through accounting techniques than in periods of expansion. Moreover, the association between inflation expectations and this behavior is nearly three times stronger in downturns than in expansionary periods (0.223% vs 0.079%). Furthermore, this finding contradicts the one of Simpson (2013), who argues that managers overstate earnings in periods when investor sentiment is high but report relatively conservatively in periods when investor sentiment is lower. Given that investor sentiment is typically lower during recessions, our results are consistent with a stronger association between inflation expectations and aggressive accounting behavior in such periods suggesting that, in the presence of financial constraints and heightened agency conflicts, recessionary pressures may dominate sentiment effects. Finally, when *ABNCFO* (sales manipulation) is used as the dependent variable, inflation expectations show a positive and statistically significant association during recessionary periods, whereas the coefficient is smaller and statistically insignificant during expansions. The magnitude of the coefficient during recessions is nearly four times (0.396% vs 0.106%) larger than during expansions, indicating that the relationship between inflation expectations and real earnings management is amplified when economic conditions deteriorate. The results on the control variables are consistent with the baseline regressions.

4.2.2 The effects of the effective lower bound. In developed economies, stock prices tend to decline following increases in inflation, particularly when inflation is unexpected. This could be attributed to the countercyclical monetary policy implemented by central banks, which pursue price stability and, therefore, raise policy rates when inflation increases. As stock prices can be estimated as the present value of all future cash flows, an increase in the discount rate tends to reduce their value. In addition, higher interest rates increase borrowing costs for firms and may lead investors to sell their stocks as other assets, like bonds, become more attractive. Thus, normally, when inflation expectations rise, stock prices could fall, as these expectations may reflect current and future tightening in monetary policy. When consumption and aggregate demand are low, monetary authorities opt to stimulate the economy by lowering interest rates. However, policy rates are constrained by the ELB, and when these levels are approached, markets seem to not take inflation into account (Zhang, 2021). Besides, actual inflation is usually low under this regime. As subsistent inflation rates influence economic agents' perceptions about price levels and shape their assumptions about

Table 6. The association between firms' inflation expectations and earnings management (accrual-based and real) across business cycle conditions

Variables	POSDA	Expansion NEGDA	POSDA	Recession NEGDA
<i>Panel A</i>				
ACCINFLFEXP				
LEV	0.000791* (1.723)	-0.00106** (-2.217)	0.00223*** (3.202)	0.000550 (0.675)
SALESGR	0.00543*** (2.540)	-0.00990*** (-4.791)	-0.00171 (-0.490)	-0.0115*** (-3.506)
SIZE	0.0177*** (14.15)	0.00430*** (3.476)	0.0172*** (7.102)	-0.00174 (-0.741)
LOSS	-0.00186*** (-10.39)	-0.00132*** (-7.934)	-0.00153*** (-6.588)	-0.00117*** (-5.011)
Constant	0.00473 (0.877)	0.00409*** (7.407)	0.00153*** (2.022)	0.00455*** (5.179)
Observations	0.0477*** (12.35)	0.0517*** (13.98)	0.0293*** (6.730)	0.0179*** (4.391)
Number of firms	22,914	22,693	6,592	6,372
Degrees of freedom	1,936	1,930	1,598	1,606
Country FE	22,818	22,597	6,533	6,313
Quarter FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
R ² within	0.1050	0.0813	0.1020	0.0759
R ² between	0.2177	0.2126	0.1986	0.1785
<i>Panel B</i>				
Variables	ABNCFRO	ABNPROD	ABNCFRO	ABNPROD
REALINFLFEXP				
LEV	0.00106 (1.097)	0.000545 (0.680)	0.00396*** (2.921)	0.00159 (1.437)
ROA	0.0260*** (3.562)	-0.00931** (-2.451)	0.00735 (0.925)	-0.00680 (-1.472)
SALESGR	-0.465*** (-14.09)	-0.154*** (-8.464)	-0.383*** (-9.709)	-0.0975*** (-4.611)
SIZE	0.00619*** (4.024)	0.00102 (0.789)	0.00720*** (3.184)	0.00142 (0.648)
LOSS	-0.00789*** (-8.496)	0.00266*** (3.657)	-0.00465*** (-5.869)	0.00255*** (4.835)
Constant	0.00179 (1.309)	0.00110 (1.253)	0.000513 (0.307)	0.00192 (1.634)
Observations	0.0716*** (5.550)	-0.00946 (-0.934)	0.0358** (2.510)	-0.0132 (-1.285)
	43,489	40,308	12,502	11,607

(continued)

Table 6. Continued

Variables	Expansion		Recession	
	<i>POSDA</i>	<i>NEGDA</i>	<i>POSDA</i>	<i>NEGDA</i>
Number of firms	1,980	1,822	1,742	1,598
Degrees of freedom	43,392	40,211	12,442	11,547
Country FE	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
R^2 within	0.0501	0.0118	0.0315	0.0078
R^2 between	0.3964	0.0673	0.2566	0.0624
Note(s): This table presents the regression results on the association between firms' inflation expectations and earnings management (accrual-based and real) during expansions and recessions as established by the CEPR. Z-statistics reported in parentheses are based on standard errors clustered by firm. The extreme values of all continuous variables are winsorized at the 1st and 99th percentiles. Definition and measurement of variables are presented in Table 1. *, ** and *** denote significance at the 10, 5 and 1% levels, respectively. All predictor variables were assessed for multicollinearity. Variance inflation factor (VIF) values are below 5, indicating no significant multicollinearity				
Source(s): Authors' own work				

future inflation, we examine if the ELB attenuates the positive relationship between earnings management and inflation expectations. We believe that the incentives to manage earnings, whether to meet or beat analysts' forecasts, maintain or increase stock prices, or secure favorable borrowing terms are restrained when the ELB is binding, as low realized inflation anchors expectations downward, thereby reducing managerial pressure to engage in such practices. Simultaneously, central banks implement quantitative easing and asset purchase programs, which, while aiming to stimulate the real economy and facilitate access to credit, may also indirectly contribute to increases in stock prices. Thus, our *H5* is summarized as follows:

H5. When the effective lower bound (ELB) is binding, the positive association between accrual earnings management and real earnings management through overproduction is weaker.

Amendola *et al.* (2020) define the ELB as the phase in which the ECB lowered the monetary policy rate first to the Zero Lower Bound and subsequently into negative values. In our sample, this regime spans 2012Q3 to 2022Q3 [8]. However, from 2020Q1 onward, a distinct policy regime emerged with the introduction of the Pandemic Emergency Purchase Program (PEPP) and associated crisis-response measures, implying a qualitatively different monetary policy stance despite policy rates remaining negative. We, therefore, treat the post-2019 period as a separate regime and define our ELB period as extending from 2012Q3 to 2019Q4. We run the following regression, where *ELB* is a dummy variable equal to 1 from 2012Q3 to 2019Q4 and 0 otherwise, *ELB* × *FIRMINFLEXP* is the interaction between ELB and firms' inflation expectations (*ACCINFLEXP* and *REALINFLEXP*) and other variables as previously defined:

$$EM_{it} = \alpha_0 + \beta_1 FIRMINFLEXP_{it} + \beta_2 ELB_{it} + \beta_3 ELB \times FIRMINFLEXP_{it} + \beta_4 LEV_{it} \\ + \beta_5 SALESGR_{it} + \beta_6 SIZE_{it} + \beta_7 LOSS_{it} + \beta_8 ROA_{it} + quarterFE \\ + industryFE + countryFE + \varepsilon_{it} \quad (5)$$

Table 7 reports the results after testing *H5*. The coefficients of *ACCINFLEXP* and *REALINFLEXP* remain positive and statistically significant at the 1% and 5% level when the dependent variables are *POSDA* and *ABNPROD*, respectively. *ELB* is negatively associated with earnings management (both accrual and real) and the interaction between *ELB* and *ACCINFLEXP* and *REALINFLEXP* turns the positive relationship between these types of earnings management and inflation expectations to insignificant. Thus, we could infer that when the ELB is binding, the positive relationship between inflation expectations and earnings management attenuates. In such periods, when inflation tends to be low (which shapes low expectations for the future), managers may have weaker incentives to increase earnings, particularly for motives related to stock-market valuation and favorable borrowing conditions. This evidence further qualifies our main argument by suggesting that inflation expectations may affect earnings management, at least in part, through channels linked to monetary policy and market valuation. When these channels are less pronounced, as in the ELB environment, the relationship appears to weaken. This pattern may help explain some of the variation observed across the heterogeneity tests and indicates that the impact of inflation expectations on managerial behavior is likely to depend on the prevailing monetary policy regime. Our findings are in line with *H5*. Coefficients of control variables are consistent with the baseline regressions.

Table 7. The role of the effective-lower bound (ELB) in the relationship between firms’ inflation expectations and earnings management (accrual-based and real)

Variables	<i>POSDA</i>	<i>NEGDA</i>
<i>Panel A</i>		
<i>ACCINFLEXP</i>	0.000994*** (3.155)	−0.000374 (−1.013)
<i>ELB</i>	−0.0320*** (−11.70)	−0.0257*** (−8.158)
<i>ELB × ACCINFLEXP</i>	−0.000759 (−1.382)	0.000679 (1.173)
<i>LEV</i>	0.00391** (2.172)	−0.00932*** (−5.168)
<i>SALESGR</i>	0.0180*** (16.17)	0.00334*** (3.150)
<i>SIZE</i>	−0.00189*** (−12.14)	−0.00145*** (−9.200)
<i>LOSS</i>	0.000181 (0.448)	0.00407*** (8.915)
Constant	0.0551*** (15.60)	0.0512*** (14.68)
Observations	36,309	35,755
Number of firms	2,170	2,169
Degrees of freedom	36,184	35,630
Country FE	Yes	Yes
Quarter FE	Yes	Yes
Industry FE	Yes	Yes
<i>R</i> ² within	0.1182	0.0891
<i>R</i> ² between	0.2133	0.2088
<i>Panel B</i>		
Variables	<i>ABNCFO</i>	<i>ABNPROD</i>
<i>REALINFLEXP</i>	0.000782 (1.131)	0.00125** (2.108)
<i>ELB</i>	−0.00566* (−1.723)	−0.00616** (−2.000)
<i>ELB × REALINFLEXP</i>	0.000318 (0.253)	0.000413 (0.459)
<i>LEV</i>	0.0274*** (4.712)	−0.00990*** (−3.322)
<i>ROA</i>	−0.481*** (−18.35)	−0.153*** (−10.22)
<i>SALESGR</i>	0.00770*** (5.898)	0.00271** (2.215)
<i>SIZE</i>	−0.00852*** (−9.812)	0.00358*** (5.025)
<i>LOSS</i>	0.000736 (0.675)	0.00186** (2.538)
Constant	0.0626*** (6.225)	−0.0130 (−1.219)
Observations	69,169	63,553
Number of firms	2,208	2,021
Degrees of freedom	69,070	63,428
Country FE	Yes	Yes
Quarter FE	Yes	Yes
Industry FE	Yes	Yes
<i>R</i> ² within	0.0570	0.0140
<i>R</i> ² between	0.4084	0.0635
Note(s): This table presents the regression results for the relationship between firms’ inflation expectations and earnings management (accrual-based and real) when monetary policy is constrained by the effective lower bound (ELB). Z-statistics reported in parentheses are based on standard errors clustered by firm. The extreme values of all continuous variables are winsorized at the 1st and 99th percentiles. Definition and measurement of variables are presented in Table 1. *, ** and *** denote significance at the 10, 5 and 1% levels, respectively. All predictor variables were assessed for multicollinearity. Variance inflation factor (VIF) values are below 5, indicating no significant multicollinearity		
Source(s): Authors’ own work		

4.3 Robustness

4.3.1 *Consumers’ inflation expectations.* To check the validity of our results, we rerun the regressions using consumers’ inflation expectations (*CONSINFLEX*) as the main independent variable. As with firms’ inflation expectations, we consider two variables:

CONSACCINFLEX and *CONSREALINFLEX*. According to [Álvarez and Correa-López \(2020\)](#), managers and consumers present similarities in shaping and using inflation expectations. This similarity is supported by the positive but moderate correlations between consumer- and firm- based measures: 0.499*** for *CONSACCINFLEX* and *ACCINFLEX* and 0.491*** for *CONSREALINFLEX* and *REALINFLEX*.

As both main independent variables exhibit similar endogeneity concerns in the *POSDA*, *NEGDA* and *ABNCFO* regressions, IV estimates are reported directly, using *ECBSURP* as an instrument. As shown in [Table 8](#), consumers' inflation expectations are positively associated with both upward and downward accrual-based earnings management, while being negatively associated with sales manipulation. In contrast, endogeneity is not detected in the *ABNPROD* regression, rendering the baseline estimates [\[9\]](#) consistent and reliable, and indicating that real earnings management through overproduction is positively associated with consumers' inflation expectations. Overall, these findings are consistent with our baseline results. The coefficients on the control variables are also similar to those reported in the baseline specifications.

Panels A and B of [Table 9](#) present the results for *H4* when the main independent variables are *CONSACCINFLEX* and *CONSREALINFLEX* derived from consumers' inflation expectations. We find that during recessions, higher inflation expectations are positively associated with accrual-based earnings management, overproduction and sales manipulation. The coefficients are larger than the coefficients of the same variables in expansion regressions, supporting *H4*. Thus, elevated consumer expectations during economic downturns are associated with higher accrual-based earnings management, overproduction and sales manipulation, which may be consistent with stock-market, budgeting or "big bath" considerations. The results for control variables are similar to those observed in previous analyses.

Panels A and B of [Table 10](#) present the results for *H5* when the main independent variables are *CONSACCINFLEX* and *CONSREALINFLEX*. Although inflation expectations remain positively associated with accrual-based earnings management and real earnings management through overproduction, *ELB* is negatively associated with earnings management, and the interaction terms between *ELB* and the independent variables attenuate the previously observed positive associations. Specifically, the coefficient of $ELB \times CONSREALINFLEX$ is statistically insignificant in the *ABNPROD* regression, while the coefficients of $ELB \times CONSACCINFLEX$ in the *POSDA* and *NEGDA* regressions are significantly negative, consistent with *H5*. During periods when the *ELB* is binding, inflation and expected inflation are low. Stock prices could increase because of lower interest rates and injected liquidity by central banks through the implementation of unconventional monetary policy measures, such as quantitative easing and asset purchases, which also improve financing conditions. Thus, at least two motives for upward earnings management, namely, maintaining stock prices and securing favorable borrowing terms, are mitigated. At the same time, the positive and statistically significant coefficient of $ELB \times CONSREALINFLEX$ in the *ABNCFO* regression suggests that sales manipulation may be more pronounced during these periods.

While there are inconsistencies across specifications and proxies, the divergence between firm-level and consumer-based measures of inflation expectations is not entirely unexpected from a theoretical perspective. Firm-level inflation expectations are more closely linked to information sets relevant for pricing, cost structures and financial decision-making, including input prices, industry conditions and forward-looking signals from financial markets. In contrast, consumer-based expectations tend to reflect household perceptions of inflation, which are often shaped by noticeable price categories (e.g. food and energy) and may be influenced by behavioral biases and information frictions.

Table 8. Second-stage IV estimates of the association between consumers’ inflation expectations and earnings management (accrual-based and real)

Variables	<i>POSDA</i>	<i>NEGDA</i>
<i>Panel A</i>		
<i>CONSACCINFLEXP</i>	0.0283*** (7.473)	0.0272*** (7.288)
<i>LEV</i>	−0.000390 (−0.183)	−0.0147*** (−7.047)
<i>SALESGR</i>	0.0157*** (12.54)	−0.000674 (−0.542)
<i>SIZE</i>	−0.00182*** (−12.53)	−0.00111*** (−7.683)
<i>LOSS</i>	0.00271*** (4.333)	0.00726*** (10.95)
Constant	0.0152*** (4.414)	0.0137*** (4.496)
Observations	36,309	35,755
Number of firms	2,170	2,169
Degrees of freedom	36,259	35,705
Country FE	Yes	Yes
Quarter FE	No	No
Industry FE	Yes	Yes
Kleibergen–Paap rk Wald F statistic	176.07	174.20
Endogeneity <i>p</i> -value	0.000	0.000
<i>R</i> ²	0.1383	0.1699
<i>Panel B</i>		
Variables	<i>ABNCFO</i>	<i>ABNPROD</i>
<i>CONSREALINFLEXP</i>	−0.0155*** (−2.580)	−0.00363 (−0.606)
<i>LEV</i>	0.00980 (1.539)	−0.0103** (−2.149)
<i>ROA</i>	−0.831*** (−24.06)	−0.230*** (−9.456)
<i>SALESGR</i>	0.0141*** (8.913)	0.00586*** (4.218)
<i>SIZE</i>	−0.00468*** (−9.607)	0.00239*** (5.105)
<i>LOSS</i>	−0.000857 (−0.547)	0.00351** (2.583)
Constant	0.0442*** (4.555)	−0.0178* (−1.738)
Observations	69,196	63,553
Number of firms	2,208	2,021
Degrees of freedom	69,145	63,502
Country FE	Yes	Yes
Quarter FE	No	No
Industry FE	Yes	Yes
Kleibergen–Paap rk Wald F statistic	366.77	314.99
Endogeneity <i>p</i> -value	0.0036	0.4483
<i>R</i> ²	0.1922	0.0537
Note(s): This table presents the second stage regression results on the association between consumers’ inflation expectations and earnings management (accrual-based and real). The Instrumental Variable used is the surprises of the ECB (<i>ECBSURP</i>). Z-statistics reported in parentheses are based on standard errors clustered by firm. The extreme values of all continuous variables are winsorized at the 1st and 99th percentiles. Definition and measurement of variables are presented in Table 1. *, ** and *** denote significance at the 10, 5 and 1% levels, respectively. All predictor variables were assessed for multicollinearity and quarter fixed effects were excluded. Variance inflation factor (VIF) values for the remaining variables are below 5, indicating no significant multicollinearity		
Source(s): Authors’ own work		

As a result, firm-level expectations may better capture the channels through which inflation expectations affect managerial decisions, including valuation and financing considerations, whereas consumer expectations may represent a noisier proxy for these mechanisms. These differences in informational content help explain the variation across specifications.

Table 9. The association between consumers' inflation expectations and earnings management (accrual-based and real) across business cycle conditions

Variables	POSDA	Expansion	NEGDA	POSDA	Recession	NEGDA
<i>Panel A</i>						
<i>CONSA</i>						
<i>ACCINFLEXP</i>						
LEV	0.000646* (1.733)	0.000567 (1.335)		0.00349*** (6.148)	0.00277*** (4.021)	
SALESGR	0.00547*** (2.557)	-0.00990*** (-4.800)		-0.00203 (-0.583)	-0.0116*** (-3.524)	
SIZE	0.0177*** (14.16)	0.00430*** (3.469)		0.0170*** (7.026)	-0.00182 (-0.774)	
LOSS	-0.00187*** (-10.44)	-0.00133*** (-7.992)		-0.00158*** (-6.855)	-0.00116*** (-5.014)	
Constant	0.000472 (0.875)	0.00413*** (7.462)		0.00166** (2.200)	0.00472*** (5.411)	
Observations	0.0473*** (12.28)	0.0519*** (13.98)		0.0244*** (5.484)	0.0147*** (3.526)	
Number of firms	22,914	22,693		6,592	6,372	
Degrees of freedom	1,936	1,930		1,598	1,606	
Country FE	22,818	22,597		6,533	6,313	
Quarter FE	Yes	Yes		Yes	Yes	
Industry FE	Yes	Yes		Yes	Yes	
R ² within	0.1049	0.0811		0.1052	0.078	
R ² between	0.2185	0.2127		0.2000	0.1831	
<i>Panel B</i>						
<i>CONREALINFLEXP</i>						
LEV	0.000919 (1.021)	0.000454 (0.742)		0.00275** (2.300)	0.00254*** (3.433)	
ROA	0.0261*** (3.567)	-0.00929*** (-2.447)		0.00726 (0.917)	-0.00689 (-1.497)	
SALESGR	-0.465*** (-14.09)	-0.154*** (-8.466)		-0.383*** (-9.699)	-0.0980*** (-4.643)	
SIZE	0.00623*** (4.049)	0.00104 (0.804)		0.00713*** (3.149)	0.00131 (0.599)	
LOSS	-0.00793*** (-8.513)	0.00264*** (3.616)		-0.00481*** (-6.057)	0.00244*** (4.624)	
Constant	0.00179 (1.315)	0.00110 (1.254)		0.000470 (0.283)	0.00199* (1.689)	
Observations	0.0715*** (5.536)	-0.00947 (-0.935)		0.0328** (2.290)	-0.0155 (-1.501)	
Number of firms	43,489	40,308		12,502	11,607	
Degrees of freedom	1,980	1,822		1,742	1,598	
	43,392	40,211		12,442	11,547	

(continued)

Table 9. Continued

Variables	Expansion		Recession	
	POSDA	NEGDA	POSDA	NEGDA
Country FE	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
R^2 within	0.0501	0.0118	0.0312	0.00815
R^2 between	0.3955	0.0679	0.2560	0.0642

Note(s): This table presents the regression results on the association between consumers' inflation expectations and earnings management (accrual-based and real) during expansions and recessions as established by the CEPR. Z-statistics reported in parentheses are based on standard errors clustered by firm. The extreme values of all continuous variables are winsorized at the 1st and 99th percentiles. Definition and measurement of variables are presented in Table 1. *, **, and *** denote significance at the 10, 5 and 1% levels, respectively. All predictor variables were assessed for multicollinearity. Variance inflation factor (VIF) values are below 5, indicating no significant multicollinearity

Source(s): Authors' own work

Table 10. The role of the effective-lower bound (ELB) in the relationship between consumers' inflation expectations and earnings management (accrual-based and real)

Variables	<i>POSDA</i>	<i>NEGDA</i>
<i>Panel A</i>		
<i>CONSACCINFLEXP</i>	0.00184*** (5.797)	0.00154*** (3.974)
<i>ELB</i>	-0.0325*** (-11.85)	-0.0262*** (-8.316)
<i>ELB</i> × <i>CONSACCINFLEXP</i>	-0.00143*** (-3.306)	-0.000899* (-1.919)
<i>LEV</i>	0.00394** (2.195)	-0.00927*** (-5.169)
<i>SALESGR</i>	0.0179*** (16.16)	0.00333*** (3.148)
<i>SIZE</i>	-0.00191*** (-12.33)	-0.00146*** (-9.242)
<i>LOSS</i>	0.000172 (0.424)	0.00409*** (8.955)
Constant	0.0548*** (15.48)	0.0512*** (14.68)
Observations	36,309	35,755
Number of firms	2,170	2,169
Degrees of freedom	36,184	35,630
Country FE	Yes	Yes
Quarter FE	Yes	Yes
Industry FE	Yes	Yes
<i>R</i> ² within	0.1188	0.0894
<i>R</i> ² between	0.2128	0.2114
<i>Panel B</i>		
Variables	<i>ABNCFO</i>	<i>ABNPROD</i>
<i>CONSREALINFLEXP</i>	0.000426 (0.537)	0.00140** (2.523)
<i>ELB</i>	-0.00625* (-1.920)	-0.00727** (-2.367)
<i>ELB</i> × <i>CONSREALINFLEXP</i>	0.00162* (1.716)	-0.000605 (-1.023)
<i>LEV</i>	0.0274*** (4.707)	-0.00987*** (-3.313)
<i>ROA</i>	-0.481*** (-18.35)	-0.153*** (-10.21)
<i>SALESGR</i>	0.00772*** (5.913)	0.00272** (2.228)
<i>SIZE</i>	-0.00858*** (-9.854)	0.00351*** (4.912)
<i>LOSS</i>	0.000755 (0.693)	0.00184** (2.504)
Constant	0.0623*** (6.197)	-0.0129 (-1.212)
Observations	69,196	63,553
Number of firms	2,208	2,021
Degrees of freedom	69,070	63,428
Country FE	Yes	Yes
Quarter FE	Yes	Yes
Industry FE	Yes	Yes
<i>R</i> ² within	0.0571	0.0140
<i>R</i> ² between	0.4082	0.0653

Note(s): This table presents the regression results for the relationship between consumers' inflation expectations and earnings management (accrual-based and real) when monetary policy is constrained by the effective lower bound (ELB). Z-statistics reported in parentheses are based on standard errors clustered by firm. The extreme values of all continuous variables are winsorized at the 1st and 99th percentiles. Definition and measurement of variables are presented in Table 1. *, ** and *** denote significance at the 10, 5 and 1% levels, respectively. All predictor variables were assessed for multicollinearity. Variance inflation factor (VIF) values are below 5, indicating no significant multicollinearity

Source(s): Authors' own work

5. Conclusion

Using households' and firms' beliefs about future inflation derived from European Commission surveys, we find that higher inflation expectations are positively associated with accrual-based earnings management (both upward and downward) and real earnings management through overproduction, whereas sales manipulation exhibits a negative association.

In recessionary periods, these associations appear to be stronger, which is consistent with the possibility that managers face additional pressure to confront declining revenues and tighter credit conditions. More specifically, upward accrual earnings management and real earnings management through sales manipulation exhibit stronger associations, when firms' inflation expectations are used as proxy, whereas both upward and downward earnings management and real earnings management through overproduction and sales manipulation show stronger associations when consumer inflation expectations are used as the main independent variable.

Finally, when interest rates are near zero and the ELB is binding, the positive relationship between earnings management and inflation expectations appears to be weaker, potentially reflecting an environment in which inflation remains subdued and expectations are more tightly anchored at lower levels.

Although the results based on the two proxies are not identical and show some inconsistencies, they are not contradictory. These differences may reflect the distinct informational sets underlying each measure. Overall, the two proxies appear to provide complementary perspectives on inflation expectations rather than conflicting evidence. Moreover, the findings of further analyses indicate that the relationship between inflation expectations and earnings management may vary depending on the prevailing economic conditions and the monetary policy stance.

These results may have implications mainly for investors and auditors, although they are based on associative relationships rather than causal evidence. The former may need to exercise greater caution regarding abnormal production levels and working-capital patterns when assessing corporate earnings and evaluating stocks, during periods of rising inflationary pressures, while the latter may need to engage in more targeted audit procedures, including closer scrutiny of inventory valuation, depreciation methods and cost allocations. Furthermore, the results may also be relevant for central banks, given their role in maintaining price stability and shaping inflation expectations through monetary policy communication. Clear and timely communication of the monetary policy stance through forward guidance may, among other effects, influence the quality of financial reporting and corporate disclosures. Finally, regulators might also adopt more rigorous monitoring or targeted disclosure requirements in periods of elevated inflation expectations or recessions, when incentives to manage earnings may be stronger.

Our research faces several limitations. For example, survey-based measures are subject to availability and measurement issues (Bańbura *et al.*, 2021), while households' inflation expectations are particularly difficult to capture and potentially the least reliable. Accordingly, inflation expectations vary across agents and time horizons, meaning that any single measure provides only an incomplete representation. Alternative proxies, such as market-based expectations derived from inflation swaps, may yield different sensitivities or patterns of association. Future research could, therefore, examine the robustness of the findings across alternative expectation measures. Future studies could also explore the associations between expectations regarding other macroeconomic indicators, such as gross domestic product, and corporate accounting practices and operating decisions.

Notes

[1.] IAS 29 requires that financial statements be restated if an economy is considered hyperinflationary. While the standard does not set a strict numerical threshold, a common indicator used in practice is cumulative inflation exceeding 100% over a three-year period.

[2.] The increase in policy rates leads to increases in interest expenses paid by the borrower.

- [3.] Stock prices are reduced because dividends and profits are discounted with higher rates.
- [4.] To enhance interpretability, we multiply negative discretionary accruals by -1 . This transformation yields a measure in which larger values indicate greater income-decreasing (downward) earnings management, making it directly comparable to *POSDA*, which captures the intensity of income-increasing manipulation. Accordingly, higher values of *POSDA* reflect stronger upward earnings management, while higher values of the transformed *NEGDA* reflect stronger downward earnings management.
- [5.] In our REM models and following Roychowdhury (2006) we do not distinguish between positive and negative values of residuals.
- [6.] Firms in our sample were classified into these sectors based on their two-digit SIC codes.
- [7.] The committee has identified the peak and trough quarters from 1970 to 2020Q2, which are presented in www.eabcn.org.
- [8.] See: European Central Bank, “Key policy rates”, available at: www.ecb.europa.eu/stats/policy_and_exchange_rates/key_ecb_interest_rates/html/index.en.html
- [9.] The coefficient of *CONSREALINFLEXP* is 0.00117** with a z-statistic of 2.430, when our main dependent variable is *ABNPROD* suggesting that increases in consumer inflation expectations are positively associated with the overproduction as a form of real earnings management at the 5% significance level. For brevity, we do not report these results.
- [10.] We cite only the number of the answer (balance statistic) used in this study, as referred to the Business and Consumer survey database files.

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Further reading

- D'Acunto, F. and Weber, M. (2022), "Rising inflation is worrisome. But not for the reasons you think", VoxEU blog entry, 4 January, available at: <https://voxeu.org/article/rising-inflation-worrisome-not-reasons-you-think>

Table A1. Questions and answers for estimating consumers' and firms' inflation expectations

Respondent group	Monthly questions	Answers
<i>Panel A. Consumers' inflation expectations</i>		
Consumer	6. "Price trends over the next 12 months"	CONS. "COUNTRY".TOT.6.BS.M (answer of 6th question balance statistic monthly per country)
<i>Panel B. Firms' inflation expectations</i>		
Sector	Monthly questions	Answers
Services	6. "Expectations of the prices over the next 3 months"	SERV. "COUNTRY".TOT.6.BS.M (answer of 6th question balance statistic monthly per country)
Retail	6. "Prices expectations over the next 3 months"	RETA. "COUNTRY".TOT.6.BS.M (answer of 6th question balance statistic monthly per country)
Industry (manufacturing)	6. "Selling price expectations for the months ahead"	INDU. "COUNT".TOT.6.BS.M (answer of 6th question balance statistic monthly per country)
Building (construction)	5. "Prices expectations over the next 3 months"	BUIL. "COUNT".TOT.5.BS.M (answer of 5th question balance statistic monthly per country)

Source(s): Authors own work: Consumer and business survey of the European commission [10]

Balance statistic is computed as:

$$B = P [1] + \frac{1}{2} P [2] - \frac{1}{2} P [4] - P [5]$$

where $P[i]$ is the frequency of response $[i]$ ($i = 1, 2, \dots, 6$):

- Prices will increase more rapidly (++).
- Prices will increase at the same rate (+).
- Prices will increase at a slower rate (=).
- Prices will stay about the same (-).
- Prices will fall (-).
- Do not know.

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