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Inflation Expectations in Action: Exploring Agents' Behaviour in a Period of High Inflation

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Abstract

Inflation expectations are important to monetary policy decision-makers. The period of high inflation after the pandemic provides a useful context for exploring how inflation expectations influence the behaviours of firms and consumers. Using survey evidence, we examine how firms and consumers react to their inflation expectations. We find that firm price- and wage-setting behaviours were positively associated with high inflation expectations over the period. These behaviours could reinforce inflation. Consumers' spending and labour market decisions tend to show increased labour supply and reduced consumption in response to high inflation expectations, which could cool rather than reinforce future inflation.

Topics: Inflation and prices
JEL codes: C, C8, C83, D, D8, D84, E, E3, E31

Résumé

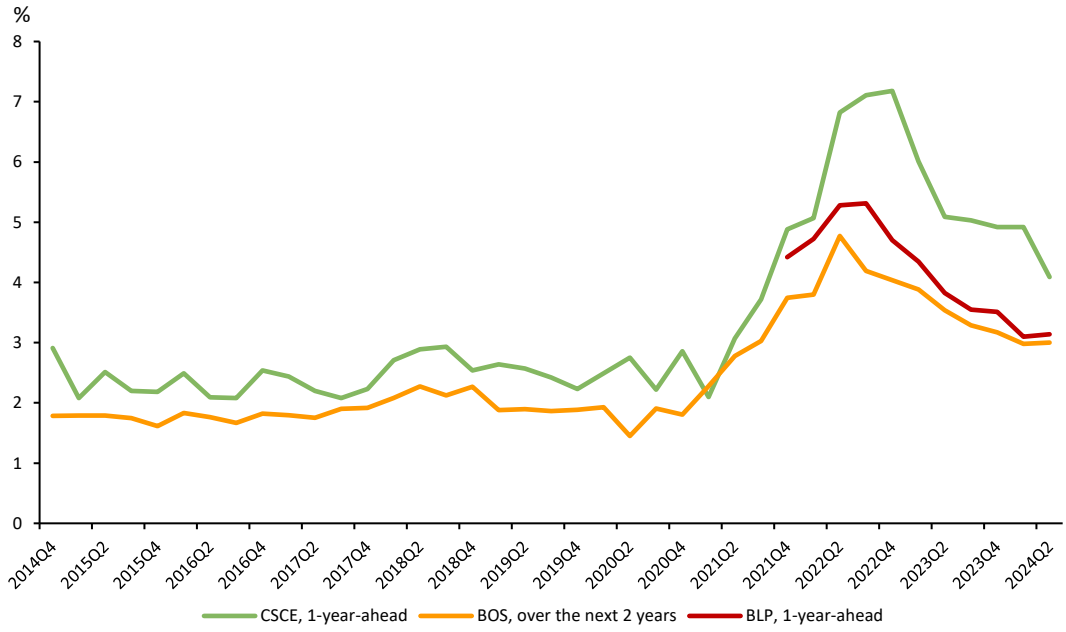
Les attentes d'inflation sont importantes pour les décideurs de la politique monétaire. La période de forte inflation qui a suivi la pandémie offre un contexte utile pour explorer comment les attentes d'inflation influencent les comportements des entreprises et des consommateurs. À l'aide de données d'enquêtes, nous examinons comment les entreprises et les consommateurs réagissent à leurs attentes d'inflation. Nous constatons que les comportements des entreprises en matière de fixation des prix et des salaires étaient positivement corrélés avec les attentes d'inflation élevées au cours de la période. Ces comportements pourraient renforcer l'inflation. Les décisions des consommateurs relativement aux dépenses et au marché du travail tendent à montrer une augmentation de l'offre de main-d'œuvre et une réduction de la consommation en réponse aux attentes d'inflation élevées, ce qui pourrait modérer plutôt que renforcer l'inflation future.

Sujets : Inflation et prix
Codes JEL : C, C8, C83, D, D8, D84, E, E3, E31

Section 1: Motivation

Firm and consumer inflation expectations increased dramatically during the period of high inflation between the fourth quarter of 2020 and the second quarter of 2022. Inflation expectations then decreased as inflation declined. But the evolution of expectations varied across agents in terms of pace, magnitude and timing, both as inflation was increasing and as it was decreasing (**Chart 1**). This period of high and varied inflation expectations provides a unique opportunity to analyze how economic agents behave in response to their expectations.

Chart 1: Respondents' inflation expectations varied across surveys



Note: BOS is the Business Outlook Survey, BLP is the Business Leaders' Pulse, and CSCE is the Canadian Survey of Consumer expectations. In the BOS, firms can select their inflation expectations from predetermined ranges and provide a point estimate. In a subset of cases, firms provide a range only, which can be open or closed. If the range is closed, we use the midpoint of the range. If the range is open, we use the average point estimate of other firms in that range. The BOS inflation expectations index value for each quarter is the trimmed mean, excluding the two highest and two lowest responses. In the BLP, firms can select their inflation expectations from predetermined ranges, which can be open or closed. We use the midpoints of the closed ranges. We assign a value of -1% to responses in the lowest open-ended range and 9% to responses in the highest open-ended range. In the CSCE, we use the interpolated median of all respondents as our measure of central tendency.

Last observation: 2024Q2
Source: Bank of Canada

A main concern for inflation-targeting central banks is that if firms and consumers act on higher inflation expectations, their behaviour can amplify inflationary pressures (Calvo 1983; Mankiw and Reis 2002). For firms, this occurs primarily through price- and wage-setting behaviours: if businesses anticipate rising input costs or demands for higher wages, they may pre-emptively raise prices. For consumers, higher inflation expectations may influence spending behaviour, wage bargaining and labour supply decisions. Consumers anticipating lower real wages may demand higher nominal wages, potentially contributing to a wage-price spiral (Blanchard 1986). Alternatively, they may reduce spending or increase labour supply to protect real income, which would exert downward pressure on inflation.

Motivated by these concerns, we explore two questions:

- Should monetary policy decision-makers be concerned when inflation expectations increase and remain elevated?
- Whose inflation expectations—those of firms or consumers—are more important to consider when expectations are elevated?

These questions have received growing attention from central bankers and policy-makers (e.g., Bullard 2016; Adrian 2023). There are two reasons for this. First, inflation expectations play a central role in models of the New Keynesian Phillips curve—where expected inflation can influence actual inflation. Second, the growing availability and length of survey time series for firms and consumers have opened new opportunities to empirically assess the extent to which expectations behave in ways consistent with theory (Webber et al. 2022).

We use responses to the Bank of Canada's Business Outlook Survey (BOS), Business Leaders' Pulse (BLP) survey and Canadian Survey of Consumer Expectations (CSCE) to explore these two questions. We find that both firms and consumers have behavioural responses related to their inflation expectations.

- Firms with higher inflation expectations tend to have higher price-setting and wage plans.
- Consumers with higher inflation expectations tend to have weaker spending plans.
- Workers with higher inflation expectations are more likely to change jobs voluntarily and ask their employers for more hours. However, we did not find an economically meaningful link between consumers' wage expectations and their inflation expectations.

Together, these points suggest that firms' behaviour in response to their inflation expectations tends to encourage inflation during the period we studied. In contrast, consumers' behaviour tends to reduce price pressures because of weaker spending and

higher labour supply during this period. This means that during the episode of high inflation that followed the COVID-19 pandemic, high inflation expectations from firms posed a greater concern for monetary policy than high inflation expectations from consumers did.

Section 2 delves into the behavioural responses of firms to inflation expectations. **Section 3** explores the behavioural responses of consumers. **Section 4** concludes.

Section 2: Impacts of inflation expectations on firms' price- and wage-setting behaviours

Central banks care about inflation expectations because these expectations can become self-fulfilling. Many firms adjust nominal prices and wages infrequently, so higher expected inflation reduces the real value of those fixed prices and wages over time. Because firms recognize this, when they expect higher future inflation, they may pre-emptively raise prices to protect margins or offer higher wages to attract or retain workers.

Economic theory suggests that these behaviours can feed directly into actual inflation (e.g., Roberts 1995; Blanchard 1986). If left unchecked, these behaviours risk triggering a wage-price spiral, where rising wages and prices reinforce each other, making inflation more persistent and harder to control. But how worried should central bankers be when inflation expectations start to deviate from the inflation-control target?

To answer this question, we first look at the impacts of inflation expectations on firms' price- and wage-setting behaviours using data from the BLP and the BOS. The BLP is a monthly online survey of 700 to 1,000 Canadian business leaders. The BOS is conducted quarterly by the Bank's regional staff through interviews with senior managers at about 100 firms representing Canada's business sector.[1]

While economic theory states that firms' behaviour can be influenced by their inflation expectations, studies using data from business surveys before and early in the pandemic period suggest that the causal impact of inflation expectations on price- and wage-setting behaviours is small or non-existent (e.g., Bottone and Rosolia 2019; Frohm 2020; Asghar, Fudurich and Voll 2023; Savignac et al. 2024). These papers find that, while inflation expectations tend to move with prices, factors such as firms' input costs, past pricing decisions and perception of sales and competition drive firms' decisions about pricing.

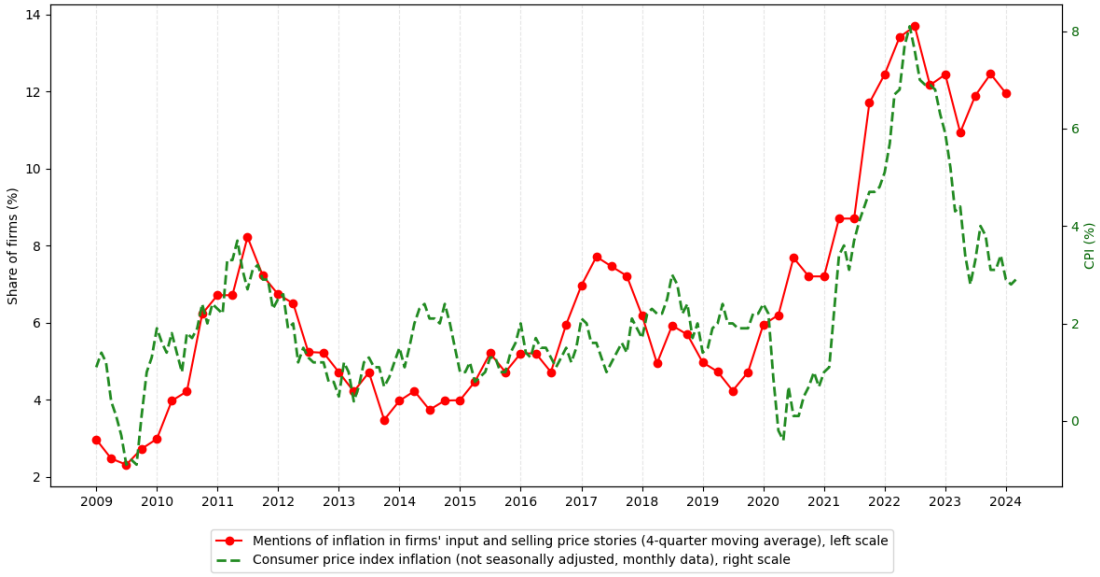
[1] For more information on the BOS, see the Business Outlook Survey web page; for more information on the BLP, see Chernis et al. (2022).

This weak link between firms' inflation expectations and their pricing decisions could be explained by the lack of variation in inflation expectations in the low inflation environment that characterized the three decades before the COVID-19 pandemic. Indeed, some studies highlight that the lack of a causal link between inflation expectations and price-setting or wages is consistent with the rational-inattention explanation for the way agents form their inflation expectations (Coibion, Gorodnichenko and Kumar 2018).

Under rational inattention, agents devote more resources to tracking variables that are important to their business decisions. When inflation is low and stable, firms rationally allocate minimal resources to tracking inflation, relying instead on relatively stable expectations for their decisions. We illustrate this in **Chart 2**, which shows the share of firms that mention the term *inflation* during conversations about their input prices and their pricing decisions with Bank staff in their responses to the BOS. We see a steep rise in these mentions starting in the third quarter of 2021, and they increase above the range of earlier fluctuations.

This timing roughly aligns with the period of high and volatile inflation after the pandemic, supporting the theory of rational inattention—firms increasingly mention inflation in discussions of their input and selling prices when inflation is elevated and changing rapidly. This finding is consistent with papers that include the post-pandemic period of high inflation. First, firms pay greater attention to inflation when it is elevated (Abberger et al. 2024). Second, inflation expectations appear to influence firms' pricing decisions (Baumann et al. 2024; Baker 2025).

Chart 2: Firms mention inflation in pricing discussions more often when inflation is high



Source: Bank of Canada Business Outlook Survey, 2009Q1–2024Q1

We contribute to this literature using data from the BLP to explore the relationship between firms' price- and wage-setting behaviours and their inflation expectations during the period of high inflation after the pandemic.[2] Roughly once a quarter, we ask firms participating in the BLP about their price- and wage-setting plans. We ask whether they plan to decrease or increase prices and whether these changes are smaller, the same or larger than normal. We also ask firms what they expect their average wage increase to be in the coming 12 months. We begin this study by investigating whether these responses vary by firms' one-year-ahead inflation expectations. Since Canadian firms tend to adjust wages about once a year (Amirault, Miller and Verstraete 2022), and about two-thirds of firms in the BLP adjust their prices once a year or more often, short-term inflation expectations are likely more relevant to these decisions than long-term expectations.

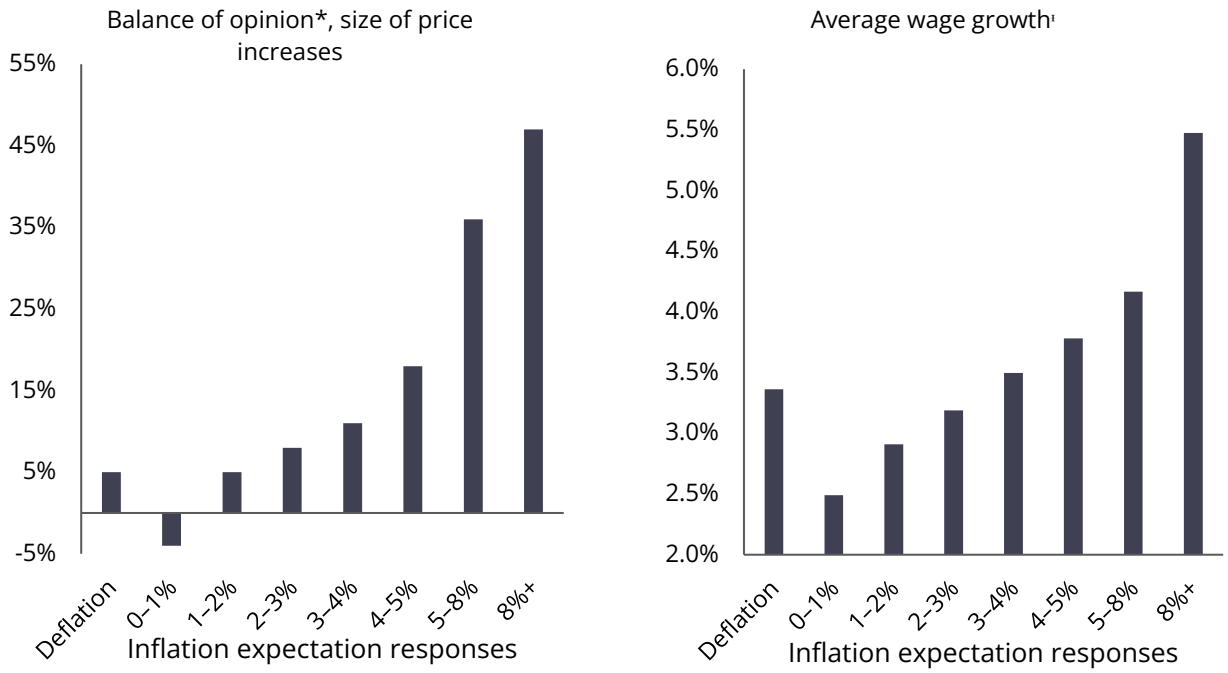
Chart 3 (panel a) shows that firms with higher one-year-ahead inflation expectations are more likely to make larger-than-normal price increases than firms with lower expectations. **Chart 3** (panel b) shows that firms' average one-year-ahead expected wage growth increases with higher one-year-ahead inflation expectations. These positive relationships hold for the full range of one-year-ahead inflation expectations, except in the small number of cases (6% of responses) where inflation expectations lie below 1%.

[2] **Appendix A1** presents a brief description of the surveys and questions analyzed in this section.

Chart 3: Firms are more likely to raise wages and make a larger-than-normal price increases when their short-term inflation expectations are high

a: Firms' price increases based on one-year-ahead inflation expectations

b: Firms' wage growth based on one-year-ahead inflation expectations



*Percentage of firms expecting larger-than-normal price increases minus the percentage expecting smaller-than-normal price increases or price decreases.

[1]Average wage using the midpoints of multiple-choice response option categories.

Note: Panel a reflects data from the period of April 2023–August 2024. Panel b reflects data from the period of September 2022–August 2024.

Source: Bank of Canada

Chart 3 suggests that a positive relationship exists between inflation expectations and firms' plans for wages and pricing. To assess the statistical significance of this relationship and whether the relationship persists when controlling for other factors, we run two probit regressions, inspired by a similar specification in Riggi and Tagliabracci (2022). We assign a binary outcome variable equal to one if a firm plans to make larger-than-normal price increases in the next 12 months and equal to zero otherwise. We include fixed firmographic controls—such as size, region, sector and exporter status—to control for differences across firm types. We also include firms' own current perception of inflation and the latest consumer price index (CPI) inflation numbers to help isolate the effect of inflation expectations from actual recent inflation, which could independently influence pricing behaviour.

The second regression uses an instrumental variable approach to control for potential endogeneity between inflation expectations and pricing plans using two-year-ahead inflation expectations as an instrument. This identification strategy relies on the idea

that price-setting behaviour is likely more directly linked to near-term expectations than to long-term expectations. Two-year-ahead inflation expectations reflect broader economic outlooks and are unlikely to directly influence the decision to implement unusually large price increases in the next 12 months. This separation in decision relevance supports the exclusion restriction assumption. **Appendix B1** provides more details on this instrumental variable approach. **Table 1** presents the marginal effects for the different inflation expectation categories. Although firms that have inflation expectations below 1% are not shown, they are included in the regression and serve as the baseline comparison group, as is typical with categorical variables. See **Appendix B1** for the full equation, discussion and description of control variables.

Table 1: High inflation expectations are associated with a higher likelihood of larger-than-normal price increases

	Probit regression, average marginal effects	IV probit, marginal effects at mean
	(1)	(2)
Inflation expectations		
1%–2%	-0.01	0.00
2%–3%	0.03	0.05
3%–4%	0.05	0.08**
4%–5%	0.09**	0.14***
5%–8%	0.17***	0.26***
8%+	0.26***	0.40***
Past price change	0.31***	0.31***
Firmographics, time-fixed effects and other controls	Y	Y
Adjusted R^2	0.18	0.20
Number of observations	1,722	1,722

Note: Firmographics includes firm size, region, sector, exporter status, export intensity and whether a firm has production outside Canada. Other controls include the latest consumer price index inflation available for each month and firms' perceptions of current inflation. Estimation is over the period from April 2023 to June 2024. P-values are based on cluster robust standard errors, clustered at the individual firm level. *** = $p < 0.01$, ** = $p < 0.05$, * = $p < 0.10$

Results in **Table 1** suggest that—even after controlling for other factors—firms with higher inflation expectations are more likely to make larger-than-normal price increases. This difference is statistically significant and economically meaningful:

- Firms with inflation expectations of 4% to 5% are about 10% to 15% more likely than firms with inflation expectations below 1% to make larger-than-normal price increases.
- Firms with expectations of 5% and above are more than 20% more likely to do so.

These results hold after taking an instrumental variable approach (Table 1, column 2).

The positive coefficient on past price changes is also statistically significant and economically meaningful, reflecting persistence in price-setting behaviour. Firms that made larger-than-normal price changes in the past 12 months are more likely to make larger-than-normal price increases in the coming 12 months. This is consistent with evidence from the literature, which shows that perceptions of past inflation have a strong link with expectations for future inflation (Jonung 1981; D'Acunto et al. 2021). This persistence in pricing behaviour illustrates how inflation expectations can affect inflation dynamics. When expectations influence pricing and pricing itself exhibits persistence, this creates a channel through which elevated inflation can become more persistent over time.

We conduct a similar exercise to examine the relationship between inflation expectations and firms' wage-setting behaviour. Like the literature on price-setting, studies using surveys of firms find that inflation expectations have no or only small causal impacts on wages in the context of the pre-pandemic period of low and relatively stable inflation and inflation expectations (Coibion, Gorodnichenko and Ropele 2020; Savignac et al. 2022). To test the relationship in the more recent period of high inflation, we run an ordered probit regression on our response categories of one-year-ahead wage growth and firms' inflation expectations. We use this approach because both our outcome variable (expected one-year-ahead wage growth) and our main explanatory variable (firms' one-year-ahead inflation expectations) are ordinal categorical variables. This method allows the marginal effect of each inflation expectation category (relative to the base category) to vary across the different levels of expected wage growth, capturing the nuanced way in which inflation expectations may influence wage-setting. More details on this regression can be found in **Appendix B1**. See **Appendix A1** for a list of wage and inflation expectation response categories.

Table 2 shows that the estimated coefficients, expressed as marginal effects, suggest that firms with lower inflation expectations are less likely to make larger wage increases. For example, compared with the base category (firms with inflation expectations below 2%), firms with inflation expectations above 5% are 19% less likely to be planning wage

increases below 2% and 18% more likely to be planning wage increases above 5%.[3] The same directional relationship holds for all the inflation expectation rows but is stronger in the higher inflation expectations categories (i.e., the colours in **Table 2** get darker from top to bottom as the coefficients become more negative or more positive). The coefficients on past wage growth are also statistically significant and economically meaningful, reflecting persistence in wage-setting behaviour.

Table 2: The marginal effects of inflation expectations on wage growth

	Wage growth				
	Below 2%	**2%–3%**	**3%–4%**	**4%–5%**	**5%+**
Inflation expectations					
2%–3%	-0.08***	-0.02***	0.03**	0.04***	0.04***
3%–4%	-0.12***	-0.05***	0.04***	0.06***	0.07***
4%–5%	-0.16***	-0.08***	0.04***	0.08***	0.11***
5%+	-0.19***	-0.12***	0.03**	0.10***	0.18***
Past wage growth	-0.03***	-0.01***	0.01***	0.01***	0.02***
Firmographics, time-fixed effects and other controls			Y		
Adjusted R^2			0.09		
Number of observations			1,155		

Note: Firmographics includes firm size, region, sector, exporter status, exporter intensity and whether a firm has production outside Canada. Other controls include the latest consumer price index inflation available for each month and firms' perceptions of current inflation. Estimation is over the period from April 2023 to July 2024. P-values are based on cluster robust standard errors, clustered at the individual firm level. *** = p<0.01, **=p<0.05, *=p<0.10

Coefficient values are colour-coded by magnitude and sign: increasingly negative coefficients are shown in darker shades of red, while increasingly positive coefficients are shown in darker shades of green.

Colour coding legend: -0.2 -0.1 0 0.1 0.2

Our results show that, even after controlling for other relevant factors, firms with higher inflation expectations tend to plan to set higher prices and wages. This in line with economic theory. However, it contrasts with existing empirical literature based on surveys, which did not consistently confirm this link, likely because they covered a period

[3] We use firms with inflation expectations below 2% as the base category in this specification (rather than below 1%, as in the earlier exercise) to ensure we have enough observations to estimate the marginal effects across all wage growth categories. Too few firms fall into the deflation and 0%–1% inflation ranges to support reliable estimation. For the same reason, the upper bound category in this regression is 5%+ rather than 8%+, as used previously.

of low and stable inflation. It is important to note, though, that firms' behaviours are not the sole influences in the economy—firms' decisions are made within the broader context of consumer behaviour.

Section 3: Consumers' behaviours in response to their inflation expectations

We now turn to the question of how consumers behave considering their inflation expectations. We explore this question using data from CSCE. Since its inception in 2014, the CSCE has helped Bank staff understand consumer expectations and behaviour in various contexts. In this section, we examine survey results for evidence of a relationship between inflation expectations and consumer spending, savings and labour market decisions.

Economic theory suggests that consumers' inflation expectations can affect inflation through two contrasting channels:

- Inflation expectations can put upward pressure on inflation through the wage-price channel. If workers expect inflation to erode their purchasing power, they may demand higher wages; this puts pressure on firms' unit costs, which then leads to higher prices.
- Inflation expectations may work to put downward pressure on inflation if consumers spend less than they would otherwise or if they increase their labour force participation.

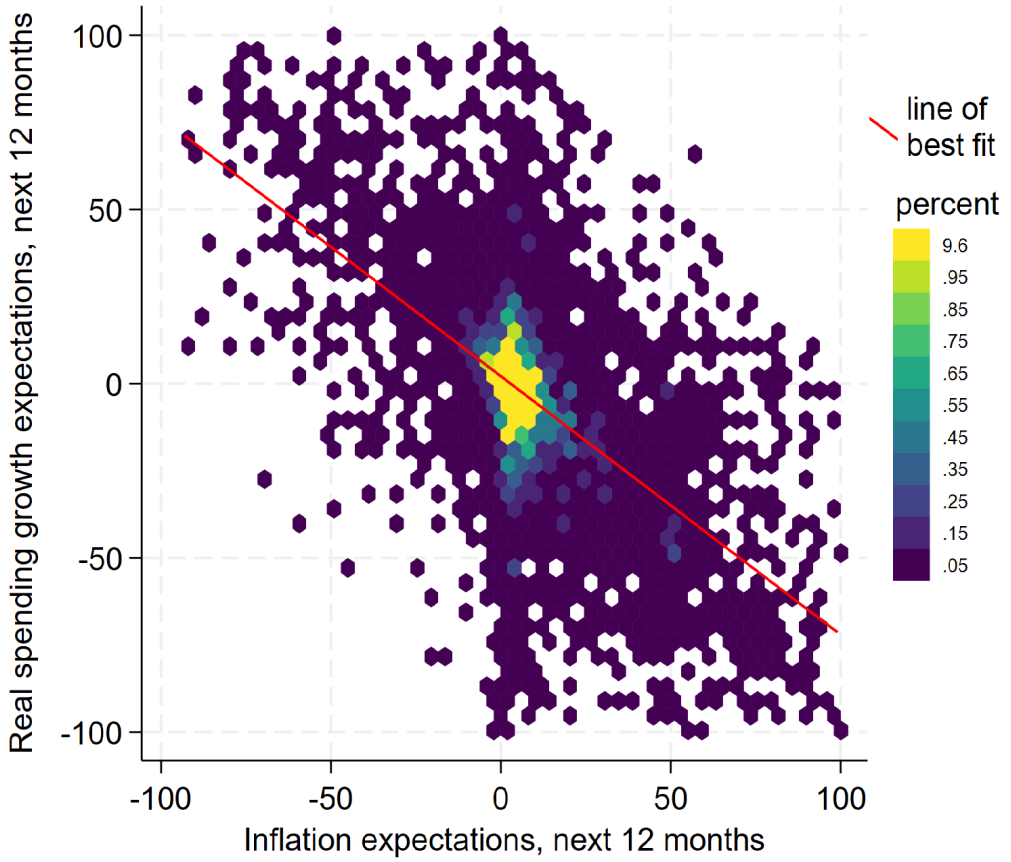
3.1. Impact on household spending expectations

The economic literature suggests a few theories for why consumer spending and inflation expectations have a negative relationship. Some work theorizes that higher inflation expectations result in intertemporal substitution—that is, as consumers expect inflation to increase, they pull forward their spending plans, which leads to lower expected spending growth (Weber et al. 2022). Others suggest that consumers associate higher inflation—and related higher inflation expectations—with a weaker economy (Jain, Kostyshyna and Zhang 2024), which could lead them to reduce their anticipated spending as a precaution.

Consistent with the literature, results from the CSCE show a negative relationship between consumers' inflation expectations and their spending growth plans (**Chart 4**). In the CSCE, we also ask consumers what they plan to do given their inflation expectations. **Chart 5** shows that the share of respondents who plan to cut their spending and shop around more increased when inflation expectations rose in the post-pandemic period.

But there was little change in the share who reported that they plan to bring forward major purchases because of their inflation expectations. Thus, **Chart 4** and **Chart 5** suggest a negative relationship between inflation expectations and Canadians' spending plans where people spend less instead of bringing forward their purchases.

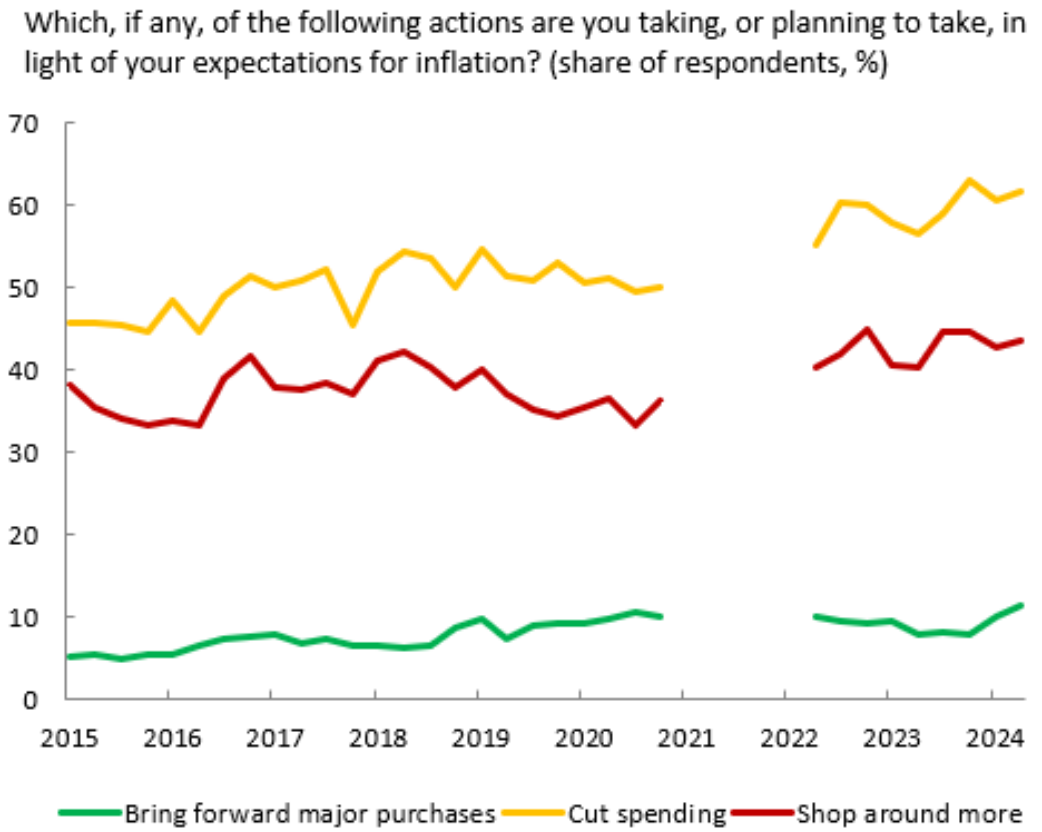
Chart 4: Consumer survey responses show a negative relationship between spending and inflation expectations



Note: Consumer inflation expectations are gathered using the question: What do you expect the rate of [inflation/deflation] to be over the next 12 months? Please give your best guess. Consumer spending growth expectations are gathered using this question: By about what percent do you expect your total household spending to [increase/decrease]? Please give your best guess. Real spending growth expectations are the difference between inflation expectations and spending growth expectations. Hexagons show the share of respondents with similar inflation expectations (horizontal axis) and real spending growth expectations (vertical axis). The colours of the hexagons represent the density of respondents, ranging from purple for a small share through green for a moderate share to yellow for the largest share. The chart include data from 2015Q1 to 2024Q2.

Source: Bank of Canada

Chart 5: Respondents report cutting spending in light of inflation expectations



Note: This chart excludes data between 2021Q1 and 2022Q1, when the question on actions in response to inflation expectations was not asked. The chart includes data from 2015Q1 to 2024Q2.
Source: Bank of Canada

To assess whether the relationship between spending plans and inflation expectations holds after controlling for other factors that are known to influence spending decisions, we follow the Euler relationship laid out in Crump et al. (2022) and Jain, Kostyshyna and Zhang (2022). For each respondent to the CSCE, we regress their real spending growth expectations on their real interest rate expectations, real income growth expectations, inflation expectations and a host of demographic controls. Real income growth expectations control for anticipated changes in household purchasing power because consumers expecting higher (lower) income are likely to anticipate spending more (less) as well. Real interest rates control for the trade-off between saving and spending because consumers are inclined to save more (less) today if they anticipate higher (lower) interest rates, suggesting higher (lower) expected consumption growth. **Table 3** (columns 1 and 2) presents these results.

Table 3: Effect of inflation expectations on real spending growth expectations

	Real spending growth expectations		Cut spending = Yes	Shop around = Yes
	OLS	IV-GMM	Logistic regression, marginal effects	
	(1)	(2)	(3)	(4)
Inflation expectations	**-0.78*** **	**-0.67*** **	**0.02*** **	**0.01*** **
Real expected income growth	0.14***	0.21***	0.00	0.00
Real interest rate expectations	0.02**	0.03***	0.00**	0.00***
Adjusted R^2	0.72	0.82	0.02	0.02
Number of observations	14,685	14,629	14,422	14,422
Respondent characteristic controls and time fixed effects	Y	Y	Y	Y

Note: Respondent characteristic controls are gender, numeracy, age, work status, marital status, income and province. Regressions in columns 1 and 2 include both Huber and analytical weights. To control for outliers, regressions in columns 3 and 4 exclude the top and bottom two percentiles of respondents to the interest rate, income growth and inflation expectations questions. Estimation is over the period from 2014Q4 to 2020Q1. OLS is ordinary least squares. IV-GMM is instrumental variable approach using generalized methods of moments. P-values are based on cluster robust standard errors, clustered on province and survey quarter. *** = p < 0.01, ** = p < 0.05, * = p < 0.10.

We find the anticipated positive relationship between expectations for real spending growth and expectations for real income growth. When people expect higher real income, they also tend to plan greater spending. We also find a small, positive relationship between expected spending growth and real interest rate expectations, consistent with intertemporal substitution theory. When consumers anticipate that interest rates will be higher in the future, they have an incentive to defer spending to the future, thus raising their expected consumption growth over the next 12 months. Still, we find a negative relationship between inflation expectations and real spending growth. This remains true when we control for possible endogeneity between inflation expectations and spending expectations.

The potential endogeneity between inflation expectations and spending growth suggests that causality might run both ways. That is, inflation expectations might influence spending expectations, and spending expectations might also affect inflation expectations. This could occur, for example, if consumers anticipate that their spending

growth is typical of most consumers, and therefore they anticipate that aggregate demand would put pressure on prices.

We use an instrumental variable approach to control for this potential endogeneity, following Crump et al. (2022). In this approach, we use as instruments two-year-ahead inflation expectations and the mean of the responses to the probability distribution around one-year-ahead inflation expectations.[4] The intuition is that the longer-term inflation expectations should be less responsive to current spending plans but still correlated with one-year-ahead inflation expectations. The probability distribution of inflation expectations supports the accuracy of the estimates. Tests show that the instruments are robust, valid and relevant. In both the ordinary least squares and instrumental variable regressions, we find a similar negative relationship that suggests that for every increase of one percentage point in inflation expectations, real spending growth expectations decline by about 0.7 percentage points. This range is similar to prior estimates in both Canada and the United States (Jain, Kostyshyna and Zhang 2022; Crump et al. 2022).

Further, using a logistic regression, we estimate the effect of inflation expectations on consumers' decisions to cut spending or shop around more. Again, we find a positive and statistically significant result, which suggests that higher inflation expectations increase the likelihood that people will cut spending and shop around more.[5]

We run a rolling regression to see how this relationship has evolved over time. To do this, we run the regressions as discussed above, incorporating 20 quarters of data. We then add one additional quarter to the end of the sample and drop one quarter from the beginning of the sample. This allows us to see how the relationship between inflation expectations and spending shown above evolves over time. If the coefficient increases during this period of high inflation, that suggests consumers' spending plans are increasingly sensitive to their inflation expectations when inflation is high. **Chart 6** presents the coefficients on inflation expectations over time. These coefficients do not change much, which suggests that the effect of inflation expectations on consumers' spending growth expectations has been roughly stable over time.

We also attempt this regression with several additional controls to test whether this finding holds. In separate regressions, we use survey questions that ask whether respondents:

- believe that inflation affects their financial situation
- know Canada has an inflation target

[4] **Appendix B2** provides more details on this regression.

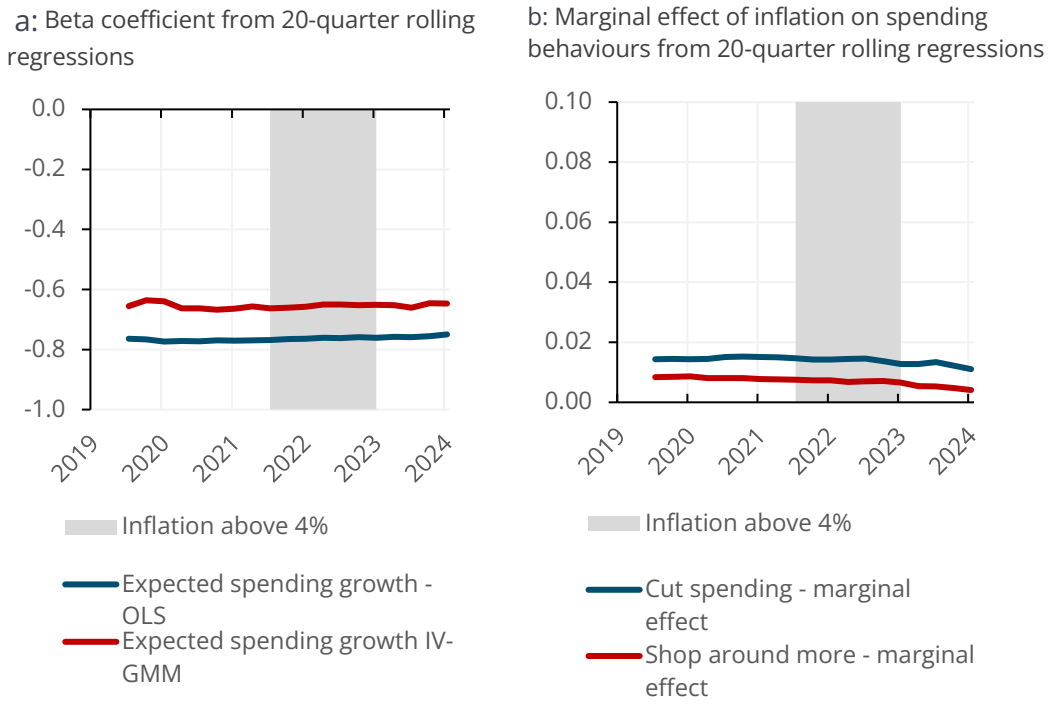
[5] **Appendix B2** provides more details on these regressions.

- understand or do not understand inflation

These questions are designed to capture respondents' understanding of and experience with inflation. Research has shown that differing understanding or experience with inflation could lead to heterogeneity in responses about behaviours (Armantier et al. 2015). The relationship between household spending plans and inflation expectations remains roughly stable over time, even after controlling for these factors. We exclude these variables from our main results due to limits in either the share of respondents that were asked that question or the time period in which the question was asked.

Overall, at the consumer level, the effect of inflation expectations on spending plans is stable over time, even during the period of high inflation. However, despite this finding, the macroeconomic impact of inflation expectations on spending would be greater in a period when more consumers have high inflation expectations because more people are affected by the same underlying mechanism. In other words, during the post-pandemic period of high inflation expectations, spending was lower than it would have been otherwise because more consumers had high inflation expectations, not because the relationship between inflation expectations and spending expectations had changed.

Chart 6: The relationship between inflation expectations and spending expectations has been fairly stable over time



Note: Coefficient and marginal effect estimates generated using a rolling 20-quarter window and the same equation as in Table 6. OLS is ordinary least squares. IV-GMM is instrumental variable approach using generalized methods of moments. Data is shown from 2019Q3 to 2024Q1.

Source: Bank of Canada

3.2. Impact on household expectations for the labour market

Next, we consider the relationship between consumers' labour market expectations and their inflation expectations. Lucas and Rapping (1969) theorize that workers want to maintain their purchasing power considering their expectations for inflation. If workers expect inflation to be high, they could demand larger nominal raises to maintain their purchasing power.

Alternatively, workers could increase their labour supply in response to their inflation expectations by working additional hours or looking for a second job to earn more income, for instance. These various response channels could have different implications for monetary policy. If workers bargain for higher wages, it could lead to a wage-price spiral as businesses increase their prices because they are faced with higher costs. In contrast, if workers increase their labour supply by switching jobs or working more hours, it could increase the productive capacity of the economy. So understanding which channels workers use to respond to their higher inflation expectations is important.

In the CSCE, we ask respondents what they expect their wage increase to be in the coming year. We also ask them if they plan to request a wage increase in response to their inflation expectations. In addition, we ask respondents how likely it is that they would either change their job voluntarily or ask their current employer for more hours. This allows us to determine which one of these channels is in effect.

To establish a baseline, we first examine the relationship between inflation expectations and two channels of interest—wage expectations and labour supply decisions—before the pandemic. Previous research using CSCE data shows a positive but economically insignificant link between inflation expectations and wages (Jain, Kostyshyna and Zhang 2024). We confirm this weak link in **Table 4** (columns 1 and 2) following the approach from Jain, Kostyshyna and Zhang (2024). On average, inflation expectations have no economically significant link with expectations for wage growth or the likelihood of a respondent asking their employer for more pay during the period under study. As Jain, Kostyshyna and Zhang (2024) show, there is heterogeneity between groups: new hires, public sector employees, those with formal inflation indexation, and workers with higher income, the correlations between wage expectations and inflation expectations are larger. Still, for the most part, this link remains economically insignificant.

We find a positive relationship between inflation expectations and labour supply decisions. As **Table 4** (columns 3 and 4) shows, before the pandemic, inflation expectations were positively correlated with respondents' reported likelihood of voluntarily changing jobs. They are also positively correlated with the chance of asking for more hours at work. Together, these results suggest that, when their inflation

expectations increase, workers are more likely to try to maintain their real purchasing power by finding a higher-paying job or supplying more labour, rather than by asking for nominal wage increases. This relationship holds after controlling for the sector of the economy the survey respondent works in.

Table 4: Positive link between labour supply decisions and inflation expectations

	Wage growth expectations		Labour supply decisions	
	Expected wage growth (ordinary least squares)	Ask for pay increases (logistic regression, marginal effects)	Probability of changing jobs voluntarily (fractional logistic model, marginal effects)	Ask for more hours (logistic regression, marginal effects)
	(1)	(2)	(3)	(4)
Inflation expectations	0.01	0.00***	0.08***	0.01***
Past wage growth	-0.44***	0.00	-0.15***	0.00
Adjusted R^2	0.57	0.03	-	0.04
Number of observations	14,272	14,366	16,692	14,366
Demographic controls and time fixed effects	Y	Y	Y	Y

Note: Demographic controls are gender, numeracy, age, work status, marital status, income and province. Regressions in columns 1 and 3 include both Huber and analytical weights. Regressions in columns 2 and 4 exclude the top and bottom two percentiles of responses to the questions on expectations for interest rates, income growth and inflation. Estimation is over the period from 2014Q4 to 2020Q1. P-values are based on cluster robust standard errors, clustered on province and survey quarter. *** = $p < 0.01$, ** = $p < 0.05$, * = $p < 0.10$.

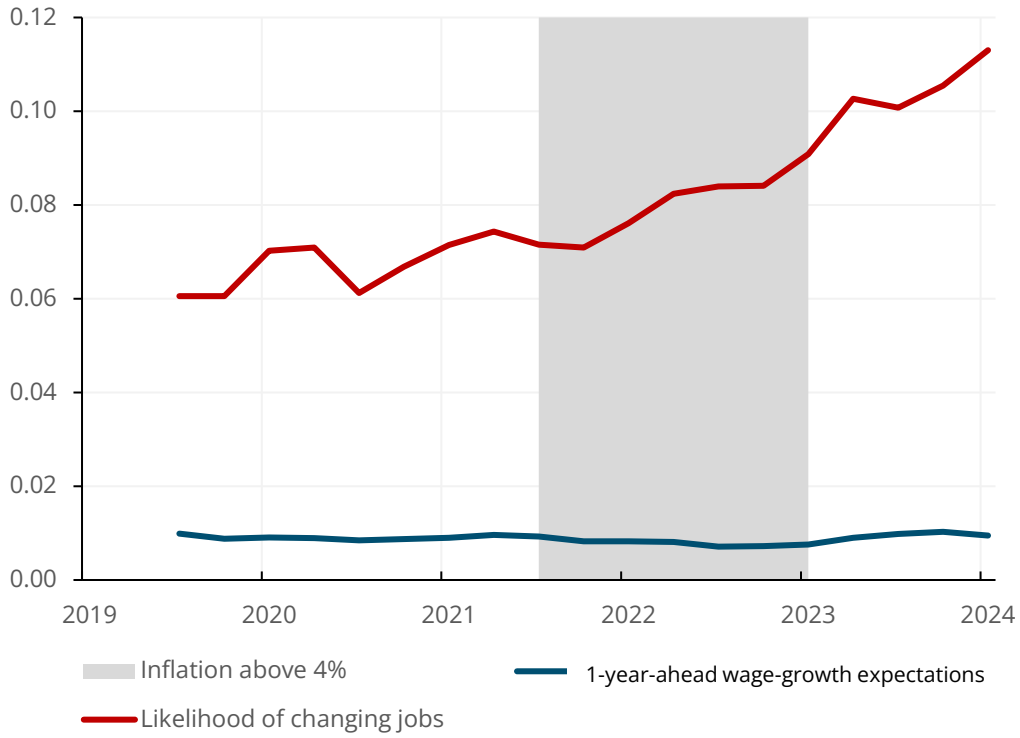
Finally, we consider how these relationships have changed in the period of high inflation. We again use a 20-quarter rolling regression to test whether the links found between inflation expectations and other variables have changed. **Chart 6** presents these results. Similar to Jain, Kostyshyna and Zhang (2024), we find a very minor increase in the link between inflation expectations and wage growth expectations after the period of high inflation began. However, the relationship is small and suggests little economically meaningful impact.

In contrast, the link between wage growth and the probability of voluntarily changing jobs increased throughout the period of high inflation. Labour market tightness during this period could be one reason for this (Bank of Canada 2023). However, this finding

does not change when we control for the probability that respondents assigned to either the unemployment rate decreasing or their own chance of finding a new job. This suggests that workers are looking for new jobs when their inflation expectations are high, which could lead to higher incomes for themselves and better matching for the labour market as a whole. This better labour market matching should lead to better productivity for those workers than would have been the case otherwise (Mincer and Jovanovic 1981). With these improved job matches, businesses could face lower costs and prices than they would have otherwise (Foster, Haltiwanger and Syverson 2008).

Chart 6: The link between inflation expectations and the likelihood of voluntarily changing jobs increased during the period of high inflation

Estimated coefficients for the relationship between inflation expectations and the likelihood of changing jobs and wage growth expectations



Note: Coefficient and marginal effect estimates were generated using a rolling 20-quarter window and the same equation as in Table 7. Data shown ranges from 2019Q3 to 2024Q1.

Source: Bank of Canada

Section 4: Conclusion

The post-pandemic period of high inflation provides a unique opportunity to examine how inflation expectations influence behaviours. These behaviours are important for a central bank to understand, given the role inflation expectations play in monetary policy. Our study of the post-pandemic period of high inflation provides evidence that elevated inflation expectations are associated with:

- inflation-reinforcing behaviour from firms
- behaviours that tend to put downward pressure on inflation from consumers

For firms, higher inflation expectations were associated with a tendency to set higher wages and prices. However, firms' inflation expectations normalized relatively swiftly, suggesting that these inflation-reinforcing behaviours were not lasting. For consumers, high inflation expectations were associated with actions that contributed to cooling inflation in this episode—including cutting spending and increasing labour supply—and were not meaningfully associated with demands for higher wage growth. Taken together, these findings suggest that firms' behaviours in response to their inflation expectations posed a higher risk of exacerbating inflationary pressures during this period of high inflation than consumers' behaviours did. This could be a useful point of comparison to use if inflation expectations were to increase once again, perhaps due to tariffs or other factors.

In this study, we focus on the period of high inflation related to the COVID-19 pandemic. However, expectations shaped by different shocks—such as central bank communication, commodity price fluctuations or changes to trade policy—could yield different behavioural responses. It remains to be seen whether this recent inflationary period has caused lasting shifts in the role of inflation expectations in price- and wage-setting, consumption choices and labour market decisions. This period may have affected the clauses in firms' supply contracts, cost pass-through practices or wage negotiations in ways that could reshape the relationship between inflation expectations and price-setting dynamics. Further, there is an apparent disconnect in the link between firms' and consumers' inflation expectations and wage expectations. These issues underscore the need for further research into how businesses and consumers form inflation expectations and how these expectations inform economic behaviour.

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Appendix A: Background on surveys and relevant questions

This appendix provides a brief background on each of the surveys used to generate the results in this paper. We also provide the full text of relevant questions.

Appendix A1: The Business Leaders' Pulse

Since May 2021, the monthly online Business Leaders' Pulse (BLP) has captured roughly 700 to 1,000 total responses per month from our panel of Canadian business leaders. The questionnaires ask about expectations for sales and employment growth, the risks to their business outlook and other questions that address the Bank of Canada's needs for specific information. These include questions about inflation expectations, wage-setting intentions, price-setting intentions and various firmographics, such as firm size, region, sector, exporter status, export intensity and whether a firm has production outside Canada. The questions relevant to this analysis—questions about firm price-setting and wage-setting behaviours—are posed to one of three BLP panel cohorts once each quarter, while other relevant variables are posed to one cohort each month. For more information on the BLP, see Chernis et al. (2022).

Business Leaders' Pulse question wording and response options

1. **Inflation perception, part 1**

We would like to seek your views of inflation* (a general increase in consumer prices) in Canada.
Over the last 12 months, do you think there was inflation or deflation in Canada?

Please choose one:

❍ inflation (increase in consumer prices)
❍ deflation (decrease in consumer prices)

2. **Inflation perception, part 2**

What do think the rate of inflation was over the last 12 months? Please give your best guess.
Please enter a number greater than or equal to 0.
Over the last 12 months, the rate of inflation was: _____

3. **One-year inflation expectations**

What do you expect the rate of inflation to be over the next 12 months?
❍ There will be a deflation (a decrease in consumer prices).
❍ The rate of inflation will be between 0% and 1%.
❍ The rate of inflation will be between 1% and 2%.

❍ The rate of inflation will be between 2% and 3%.
❍ The rate of inflation will be between 3% and 4%.
❍ The rate of inflation will be between 4% and 5%.
❍ The rate of inflation will be between 5% and 8%.
❍ The rate of inflation will be 8% or higher.

4. **Past price change**

Over the past 12 months, on average across the products and services you sell, the size of your price changes (in %) have been:
❍ larger than normal
❍ about the same as normal
❍ smaller than normal

5. **Future price change**

Over the next 12 months, on average across the products and services you sell, the size of your price changes (in %) have been:
❍ larger than normal
❍ about the same as normal
❍ smaller than normal

6. **Future price magnitude**

Over the next 12 months, on average across the products and services you sell, your selling prices are expected to:
❍ decrease significantly
❍ decrease slightly
❍ remain the same
❍ increase slightly
❍ increase significantly

7. **Past wage growth**

Looking back, what was the average wage increase at your firm over the last 12 months?
___

8. **Future wage growth**

What is your expectation for the average wage increase at your firm for the next 12 months?
❍ There will be reduction in the average wage.
❍ The average wage will stay about the same.
❍ The rate of increase will be between 0% and 1%.
❍ The rate of increase will be between 1% and 2%.
❍ The rate of increase will be between 2% and 3%.

❍ The rate of increase will be between 3% and 4%.
❍ The rate of increase will be between 4% and 5%.
❍ The rate of increase will be between 5% and 8%.
❍ The rate of increase will be 8% or higher.

Appendix A2: The Canadian Survey of Consumer Expectations

The Canadian Survey of Consumer Expectations (CSCE) is a quarterly online survey of roughly 2,000 Canadian consumers. The CSCE solicits responses on consumers' expectations about, among other things:

- inflation
- wages
- interest rates
- spending behaviours
- changes in financial well-being
- changes in socio-demographic factors

The CSCE is composed of core questions that have been asked since the survey's inception in the fourth quarter of 2014 and special topical questions of interest. For more information, see the Canadian Survey of Consumer Expectations.

Canadian Survey of Consumer Expectations question wording and response options

1. **1-year inflation expectations**

Over the next 12 months, do you think that there will be inflation or deflation? (Note: deflation is the opposite of inflation)

Please choose one:

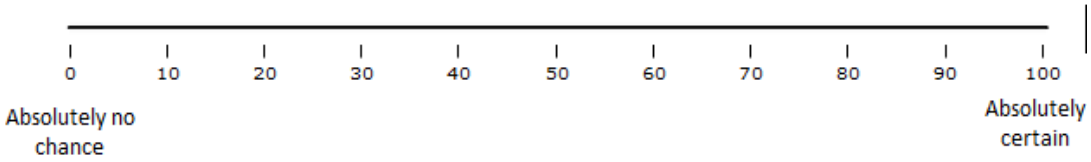
❍ inflation
❍ deflation (the opposite of inflation)

What do you expect the rate of [inflation/deflation] to be **over the next 12 months**? Please give your best guess.
Please enter a number greater than 0 or equal to 0.
❍ **Over the next 12 months**, I expect the rate of [inflation/deflation] to be ___ %

2. **Voluntarily job changing**

What do you think is the percent chance that you will leave your [main/current] job voluntarily **during the next 12 months**?

Please enter your response in the box below, where 0% means "Absolutely no chance" and 100% means "Absolutely certain."



3. **Total household spending**

Over the next 12 months, what do you expect will happen to the total spending of all members of your household (including you)?

Please choose one.

Over the next 12 months, I expect my total household spending to:

❍ increase by 0% or more
❍ decrease by 0% or more

By about what percent do you expect your total household spending to [increase/decrease]? Please give your best guess.

Please enter a number greater than 0 or equal to 0.

Over the next 12 months, I expect my total household spending to [increase/decrease] by ___ %

4. **Past wage growth**

Over the last 12 months, do you think that your earnings on your ['job' or 'main job' if respondent has more than one job]" have increased or decreased, before taxes and deductions?

Please choose one.

Over the last 12 months, my earnings have:

1. increased by 0% or more
2. decreased by 0% or more

By about what percent do you think your earnings have [**'increased' or 'decreased'**] on your ['job' or 'main job' if respondent has more than one job], before taxes and deductions? Please give your best guess.

Please enter a number greater than 0 or equal to 0.

Over the last 12 months, the rate of [**'increase' or 'decrease'**] in my earnings was ___ %

5. **Expected wage growth**

Please think ahead to **12 months from now**. Suppose that you are working in the exact same ['job' or 'main job' if respondent has more than one job]" at the same place you currently work and working the exact same number of hours. What do you expect to have happened to your earnings on this job, before taxes and deductions?

Please choose one.

Twelve months from now, I expect my earnings to have:

❍ increased by 0% or more
❍ decreased by 0% or more

By about what percent do you expect your earnings to have [increased/decreased]? Please give your best guess.

Please enter a number greater than 0 or equal to 0.

Twelve months from now, I expect my earnings to have [increased/decreased] by ___ %

6. **Interest rate expectations**

At what level do you think that interest rates on things such as mortgages, bank loans and savings will be in …

Please enter a number.

One year from now, interest rates will most likely be ___ %

7. **Actions in response to inflation**

Which, if any, of the following actions are you taking, or planning to take, in light of your expectations of ['inflation' or 'deflation'] **over the 12-month period between [t+12 and t+24]**?

Please select all that apply.

a. Bring forward major purchases (such as furniture or appliances)
b. Postpone major purchases
c. Cut back spending and save more
d. Shop around more for better value goods and services
e. Push for increased pay with current employer
f. Look to increase income in other ways (e.g., change jobs, take on second job, work more hours with current employer)
g. Take no action

8. Understanding of inflation

On a scale of 1 to 7, how well would you say you understand what "inflation" means?

Please select only one.

I don't know what "inflation" means						I know exactly what
1	2	3	4	5	6	7

9. Knowledge of inflation target

Did you know that Canada has an inflation target?

- Yes
- No

Appendix A3: The Business Outlook Survey

The Business Outlook Survey (BOS) is a face-to-face quarterly survey with both in-person and virtual interviews with roughly 100 private-sector firms per quarter. The Bank has been conducting the BOS since 1997 to assess real-time business conditions and firms' expectations for sales, employment, investment, pricing behaviour, inflation and more. For more information, see Amirault, Rai and Martin (2020).

Business Outlook Survey question wording and response options

1. Inflation expectations

Over the next two years what do you expect the annual rate of inflation to be based on the Canadian consumer price index?

Include point estimate (if reported): _____

- Below 1%
  - Deflation
- Between 1% and 2%
- Between 2% and 3%
- Above 3%
- N/A

6.16. If above 3%, please check whether you expect inflation to be:

- between 3% and 4%
- between 4% and 5%
- between 5% and 6%
- between 6% and 7%
- between 7% and 8%
- above 8%
- N/A

Appendix B: Regression details

This appendix gives more detailed information on the regression results presented throughout this paper.

Appendix B1: Details about the regressions for firm price-setting and wage-setting

Section 2.1, Table 1: We estimate the probit model presented in **equation (B1)**, inspired by a similar specification in Riggi and Tagliabracci (2022). Standard errors are clustered at the firm level to account for intra-firm correlation in the error terms.

$$P(Y_i = 1|X) = \Phi\left(\beta_0 + \sum_{j=1}^{5} \delta_j D\left(\pi_{i,t}^{e,t+12}\right) + \beta_1 LNPC_{i,} + \beta_2 \pi_t + \beta_3 \left(\pi_{i,t}^{e,t}\right) + \boldsymbol{X_i} \right) \quad \text{(B1)}$$

We estimate the probability of firms making a larger-than-normal price increase in the next 12 months ($Y_i=1$) using equation (B1). Here, Φ represents the standard normal cumulative distribution function. The coefficients $(\delta_j D,\ \beta_1,\ \beta_2, and\ \beta_3)$ capture the marginal effects of the explanatory variables on the latent propensity to make a larger-than-normal price increase.

To explore the link between inflation expectations and price-setting behaviour, we include a series of dummy variables for five of the six inflation expectation response options $\left(\pi_{i,t}^{e,t+12}\right)$.[6] The base category consists of inflation expectation responses below 1%, including responses of deflation. We include an indicator variable for making a larger-than-normal price change in the past year $(LNPC_i)$ to capture the possible persistence in pricing behaviour. We add current period actual inflation (π_t) and firms' perceptions of current inflation $\left(\pi_{i,t}^{e,t}\right)$. We include a vector of firmographic controls and year-quarter fixed effects in the variable $\boldsymbol{X}_i$,in the spirit of Nakamura and Steinsson (2008).

In our instrumental variable approach, we use firms' two-year-ahead inflation expectations as an instrument. Two-year-ahead inflation expectations are correlated with one-year-ahead expectations; however, we argue that two-year-ahead inflation expectations should not have a strong relationship with pricing strategies in the next year and should instead be related more to structural factors such as the inflation

[6] Although firms may choose from eight inflation expectation response options in the BLP questionnaire, we combine two categories (deflation and inflation below 1%) for this regression. Ensuring a large enough sample sizes for each category is necessary for model estimation. For the same reason, response options are combined to create five categories for the wage-setting equation.

target. The first-stage F-stat here is 67—much greater than the threshold in Stock and Yogo (2005)—which suggests that this is not a weak instrument. Additional specifications—which included past and expected future wage growth, proxies for capacity constraints (e.g., labour shortages or demand concerns), the reported frequency of prices changes over the past 12 months and planned frequency of changes over the next 12 months, and future sales expectations—yielded no meaningful change in results for our variables of interest.

Section 2.1, Table 2: Equation (B2) represents the ordered probit model for wage-setting behaviour. Standard errors are clustered at the firm level.

$$P(Y_i = k|X) = \Phi\left(\beta_0 + \beta_1 Past\ wage_i + \beta_2(\pi_t) + \beta_3\left(\pi_{i,t}^{e,t}\right) + \sum_{j=1}^{5} \delta_j D\left(\pi_{i,t}^{e,t+12}\right) + X_i\right), for\ k = 1,2,3,4,5 \quad \text{(B2)}$$

We estimate the probability of expected one-year wage growth at a firm (Y_i) falling into one of five wage categories represented by k (below 2%, 2% to 3%, 3% to 4%, 4% to 5%, 5% and above) based on the explanatory variables outlined below.

We include a series of dummy variables for five inflation expectation response options $\left(\pi_{i,t}^{e,t+12}\right)$ to explore the link between inflation expectations and wage-setting behaviour. The base category consists of inflation expectation responses below 1%, including responses of deflation.

In the same spirit as our price-setting equation, we add a variable for past wage growth to capture the possible persistence of wage-setting behaviour $(Past\ wage_i)$. We also include current CPI inflation (π_t), respondents' perceptions of current inflation $\left(\pi_{i,t}^{e,t}\right)$,and a vector of firmographic controls and year-quarter fixed effects controls in the variable $\boldsymbol{X}_i$.Unlike the regressions on price-setting behaviour, we cannot add firms' future sales expectations or other controls due to the structure of the BLP data. Although an instrumental variable approach would be interesting, the use of categorical variables for both the dependent and independent variable of interest creates difficulty in interpreting the instrumental variable. However, we run an instrumental variable model assuming that the left-hand variable is linear, using two-year-ahead inflation expectations as an instrument for one-year-year expectations. In this approach, the first-stage F-statistic was large, and the results remained consistent.

Appendix B2: Details for consumer behaviour

Section 2.2, Table 5: We use **equation (B3)**, based on work from Crump et al. (2022), to generate the regression results shown in **Table 3**, columns 1 and 2:

$$E\left(\Delta c_{i,\,t+1}^{real}\right)_{i,\,t} = \beta_1 + \beta_2 E\left(\pi_{\,t+1}\right)_{i,\,t} + \beta_3 E(r_{t+1})_{i,\,t} + \beta_4 E\left(\Delta y_{i,\,t+1}\right)_{i,\,t} + \boldsymbol{X}_i + e_t \qquad \text{(B3)}$$

where $E\left(\Delta c_{i,\,t+1}^{real}\right)_{i,\,t}$ represents the respondents expected growth in real spending in the next year, $E\left(\pi_{\,t+1}\right)_{i,\,t}$ represents their inflation expectations in the next year, $E(r_{t+1})_{i,\,t}$ represents their expectations for interest rates in the next year and $E\left(\Delta y_{i,\,t+1}\right)_{i,\,t}$ represents their expectations for real income growth in the next year.

We generate real expectations for consumption, interest rates and income growth to use in this regression by subtracting respondents' inflation expectations from their nominal expectations. We include a vector of demographic controls in the variable $\boldsymbol{X}_i$. The regression also includes time and province fixed effects. The inflation expectations variable may be endogenous to peoples' real consumption expectations. Because of this, we improve the accuracy of our estimate by using an instrumental variable approach, inspired partly by Crump et al. (2022), and use the weighted average of the probability that respondents assign to inflation falling in a particular range as an instrument for their inflation expectations. We also include respondents' two-year-ahead inflation expectations to control for endogeneity. We expect two-year-ahead inflation expectations to be exogenous because these longer-term expectations should still be correlated with the one-year-ahead expectations. However, they should also be less influenced by short-term factors and more influenced by structural factors, such as inflation targets and central bank credibility. **Table B2-1** presents test statistics for this instrumental variable approach.

Table B2-1: Test statistics for instrumental variables

First-stage F-statistic	26.7***
Hansen's J test	0.04291 (p = 0.8359)

Note: This test statistics are for the instrumental variable approach presented in Table 3, column 2.

The first-stage regression F-statistic is 26.7, well above the threshold of 10 (Stock and Yogo 2005), which suggests it is a robust instrument and is relevant as a strong predictor of one-year-ahead inflation expectations. The Hansen's J test statistic fails to reject the null hypothesis that the instruments are valid. Together, the F-statistic and the J test suggest that the instrumental variable approach is sound.

In **Table 5**, columns 3 and 4, we take a similar approach and include the same variables as shown in equation (B5). Instead of expected growth in real spending in the next year,

we use a logit model, and the left-hand variable takes a value of one if the respondent reports that they are cutting spending or shopping around more due to their inflation expectations.

Section 2.2, Table 4: We use **equation (B4)**, based on Jain, Kostyshyna and Zhang (2022), to create the regression results shown in **Table 4.**

$$E\left(\Delta w_{i,\,t+1}\right)_{i,\,t} = \beta_1 + \beta_2 E\left(\pi_{\,t+1}\right)_{i,\,t} + \beta_3 E\left(\Delta w_{i,\,t-1}\right)_{i,\,t} + \boldsymbol{X}_i + e_t \qquad \text{(B4)}$$

where $E\left(\Delta w_{i,\,t+1}\right)_{i,\,t}$ is expected wage growth in the next 12 months, $E\left(\Delta w_{i,\,t-1}\right)_{i,\,t}$ is perceived wage growth in the past 12 months, and $E\left(\pi_{\,t+1}\right)_{i,\,t}$ is one-year-ahead inflation expectations. Again, we include a vector of demographic controls in the variable $\boldsymbol{X}_i$. We use this same framework but change the left-hand variable for the probability the respondent assigns to voluntarily leaving their job. We use the framework again with the logit regressions where the left-hand variable takes a value of one if the respondent would ask for a wage increase or ask for more hours in response to their inflation expectations.