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Measuring Demand and Supply Pressures Using Business Surveys ^{*}

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Abstract

We decompose firms' selling price expectations into demand- and supply-driven components using survey responses on expected selling prices and demand conditions. Our results indicate that economic activity and monetary policy shocks are transmitted primarily through the demand-driven component. This component is robustly associated with inflation in sector-level Phillips curve regressions, highlighting the importance of demand-side expectations for the transmission of demand shocks to inflation.

JEL codes: D84, E31, E32, E52

Keywords: business surveys, demand, supply, selling price expectations, Phillips curve, demand shocks.

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The views and results presented in this paper are those of the author and do not necessarily represent the official opinion of the National Bank of Slovakia. Any errors that remain are my own.

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Non-technical summary

Firms' intentions to raise their selling prices can provide a useful indicator of future inflationary pressures. If more firms intend to raise their prices than in a previous period, then inflation is likely to rise. Therefore, business surveys of firms in the construction, industrial, retail trade and services sectors might provide timely signals regarding price pressures in different sectors of the economy.

Moreover, by combining firms' expectations regarding current and future demand and selling prices, it is possible to determine whether they intend to change their prices due to demand or supply factors. Demand factors influence firms' intentions to raise (lower) their selling prices when they anticipate and experience higher (lower) demand. Conversely, supply factors influence firms' intentions to raise (lower) their selling prices when they anticipate and experience lower (higher) demand.

Decomposing firms' expectations reveals that both Slovakia and the euro area experienced adverse demand and supply pressures during the pandemic. Weaker demand lowered selling price expectations and economic activity, whereas supply disruptions increased selling price expectations while reducing activity. During the first wave, Slovakia's industry, construction and services sectors recorded sharp falls in demand-driven selling price expectations. The declines in industry and services were substantially larger than during the 2007–2009 recession, while the trough in construction was broadly comparable to that during the Great Recession. The industrial sector subsequently recorded a particularly rapid recovery from its initial collapse. In the euro area, the largest decline in demand occurred in services, followed by industry, retail trade and construction. At the same time, Slovakia experienced the strongest adverse supply pressures in services, industry, and construction in 2020, while sizeable adverse supply pressures emerged across all four sectors in the euro area. In Slovakia, adverse supply pressures in services and industry were substantially stronger than during the Great Recession, as were those in euro-area services.

Between 2021 and 2023, firms' expectations point to strong positive demand pressures in Slovakia, most notably in retail trade and services, with positive demand pressures also evident in industry and construction. In industry, adverse supply pressures strengthened in 2022, exceeding the positive demand component in several months during the second half of the year, particularly towards the end of the year. In the euro area, positive demand factors clearly dominated adverse supply in both industry and services. By contrast, adverse supply factors were roughly equal to positive demand factors in construction and, on average, slightly more important in retail trade, despite elevated positive demand in both sectors. Overall, the post-pandemic period was characterised by historically elevated demand and adverse supply pressures in both Slovakia and the euro area, which contributed to a significant increase in firms' selling price expectations.

The results show that producer prices tend to rise when a larger share of firms expects higher selling prices amid strong demand conditions. This finding can be interpreted within a Phillips curve framework, in which producer price inflation is linked to economic activity and inflation expectations. Firms' expectations appear to capture demand conditions that are not fully reflected in conventional measures of economic slack. Their association with producer price inflation remains robust after controlling for lagged inflation and broader economic conditions, although producer price inflation itself is highly persistent. Notably, this association reflects differences across sectors within the same country and period, rather than broader country-level changes or persistent differences across sectors and countries. During the recent inflation surge, producer price inflation was significantly higher overall, while the relationship between firms' expectations and price growth remained broadly unchanged.

1. Introduction

Can business surveys help identify the factors behind firms' intentions to change their selling prices? Because these surveys contain firms' responses regarding expected changes in selling prices and current and expected demand or business activity, these expectations can be decomposed into demand- and supply-driven components.

This study uses the European Commission's business surveys in four sectors – construction, industry, retail trade, and services – in Slovakia and the euro area to break down firms' expectations into demand- and supply-driven components. This decomposition provides real-time information about demand and supply pressures across sectors, offering a bottom-up approach to calculating the corresponding pressures by aggregating the different sectors using their respective weights.

The study demonstrates that aggregated firm-level responses can be used to decompose expectations into demand- and supply-side components. Specifically, it shows that the aggregation of a linear combination of firm-specific responses is equivalent to the linear combination of aggregated responses, provided that consistent weights are applied throughout the aggregation process. This property enables the construction of indicators aligned with demand and supply factors using only aggregated survey data. Furthermore, by combining firms' expectations regarding prices and demand (e.g., business or production activity, depending on the sector) with their realised assessments of demand (e.g., business or production activity, depending on the sector), it is possible to identify the underlying drivers of observed movements. Co-movements between expected prices and both expected and realised demand indicate demand-side influences, whereas movements in opposite directions suggest supply-side factors.

In Slovakia, firms' expectations suggest that the pandemic was initially associated with stronger adverse demand and supply pressures in the construction and industrial sectors and in services than in retail trade. From 2021 onwards, positive demand pressures emerged across all sectors, while adverse supply pressures persisted in construction and intensified in industry in 2021. Adverse supply pressures also intensified in the services sector in 2022.

During the inflation surge of 2021–2023, positive demand pressures were historically elevated, reaching a sample high in retail trade, their highest level in more than a decade in services and in around two decades in construction, while remaining elevated in industry. Adverse supply pressures were also historically elevated, reaching their highest levels since 2004 in construction and 2003 in retail trade. In industry and services, however, adverse supply pressures remained below the exceptionally high levels recorded during the first wave of the pandemic. Selling price expectations in the services sector were predominantly demand-driven. Demand factors also predominated in retail trade and dominated in industry over the period as a whole, although adverse supply pressures became particularly pronounced in industry in 2022, while in construction positive demand and adverse supply factors were of broadly comparable importance. Overall, firms' selling price expectations during the inflation surge reflected a combination of strengthening demand and deteriorating supply conditions, both of which reached historically elevated levels. Given the importance of services in the Slovak economy and the prevalence of demand-driven expectations in retail trade, the aggregate decomposition indicates that, on average, firms' selling price expectations were predominantly demand-driven.

The aggregate results for the euro area are similar: on average, the surge in inflation from 2021 to 2023 was predominantly demand-driven, primarily reflecting developments in the services and industrial sectors. Positive demand pressures were exceptionally strong across all sectors during this period, with

the demand-driven component reaching its highest level since the beginning of the sample in 2002 in industry, services, construction, and retail trade. Nevertheless, adverse supply pressures were also exceptionally strong. During 2022–2023, the negative supply-driven component of firms' expectations reached its highest level since 2002 in industry, construction, and retail trade. In services, adverse supply pressures were also historically elevated but remained below their peak during the pandemic.

In a Cholesky-identified vector autoregression, the decomposed demand and supply components of firms' selling price expectations across different sectors of the economy, when ordered first, generate impulse responses consistent with demand and supply shocks, respectively. Specifically, a structural shock impacting the demand component of selling price expectations, together with inflation and industrial production, moves all three of these variables in the same direction. Conversely, a structural shock impacting the supply component of selling price expectations, together with inflation and industrial production, moves industrial production in a different direction from the first two variables.

Our results show that firms' selling price expectations, particularly those driven by demand, are a significant predictor of producer price dynamics across sectors. In line with the Phillips curve model, stronger demand-side expectations are associated with higher producer inflation, even when past price developments and aggregate shocks captured by country-time fixed effects are taken into account in a sector-country panel regression. Producer inflation is also found to exhibit substantial persistence over time. By contrast, traditional measures of economic slack provide no additional explanatory power once country-time fixed effects are accounted for. This suggests that firms' expectations may be a more precise indicator of underlying economic conditions. This relationship remains robust during the recent inflation surge, suggesting that firms' expectations may play a role in the transmission of demand shocks to firms' prices.

Demand shocks, such as those related to global economic activity and monetary policy, affect firms' selling price expectations mainly through the demand-side component. The supply-side component is also affected, but its response is substantially smaller in magnitude. Consequently, firms' selling price expectations respond to demand shocks predominantly through the demand-side component.

The study most closely related to this one is [Battistini and Neves \(2026\)](#). Like those authors, we use firms' answers regarding their selling price expectations and demand from the European Commission's harmonised business survey ([European Commission, 2026a](#)) to study the demand and supply components of selling price expectations and their transmission to inflation. Unlike [Battistini and Neves \(2026\)](#), this study does not rely on sign-restricted Bayesian structural vector autoregression for the decomposition itself; it is free from revisions, does not rely on priors, and does not require a sign-restriction procedure. The demand and supply components of firms' price expectations derived in this study are not revised in real time and are available at a monthly frequency. Moreover, the demand and supply components of firms' selling price expectations, as derived in this study, behave like demand and supply shocks when ordered first in a Cholesky-identified structural vector autoregression model, without the need for any additional restrictions.

The study makes several contributions to the literature. First, it enables us to analyse demand and supply pressures by sector in real time. These indicators are sector-specific, updated monthly, and not subject to revisions. Similarly, [Shapiro \(2024\)](#) classified inflation components as demand- or supply-driven using the signs of residuals from price and quantity regressions for personal consumption expenditure (PCE) components. [Gonçalves and Koester \(2022\)](#) applied this decomposition to the euro area. However, the approach has several limitations: (1) item-based turnover for the euro area is released with a delay, (2) it only provides a discrete decomposition (either demand- or supply-driven), which cannot indicate

the relative magnitude of the effect, and (3) it is model-dependent. Our approach does not have any of these problems. The proposed decomposition method can be used to extract real-time demand and supply signals for monetary policy. Moreover, this methodology is not affected by issues relating to the availability of real-time data for demand-supply decomposition, as discussed by [Giannone and Primiceri \(2025\)](#).

To decompose inflation into demand and supply components, [Eickmeier and Hofmann \(2022\)](#) employed a factor model for inflation and real activity in the euro area. Using sign restrictions on factor loadings, they identified demand and supply factors and found that the inflation surge from mid-2021 was due to positive demand and negative supply factors. Consistent with their findings, our analysis of firms' selling price expectations shows that demand pressures in the euro area not only returned to pre-2007 levels in 2021 but subsequently surpassed them, while negative supply pressures from 2021 onwards reached their highest level in the sample period, slightly exceeding the peak observed during the pandemic. Furthermore, the authors used hard quarterly data on inflation and real activity, which are available with some delay and are subject to data revisions.

Several studies have used business surveys to distinguish between demand and supply factors underlying price dynamics. For instance, [Balleer et al. \(2020\)](#) used the Ifo Business Climate Survey, along with additional survey questions related to the pandemic, to study the demand and supply forces behind firms' planned price adjustments during the pandemic. They found that, while both demand and supply factors characterised the pandemic, demand was, on average, more important than supply. The findings of this study suggest that negative demand was more important than negative supply for firms' selling price changes in 2020. [Pasimeni \(2022\)](#) also used European Commission business surveys and decomposed sectoral price inflation into demand and supply components, using the proportion of firms that cited demand or shortages of materials and equipment as limiting factors in production. Nonetheless, these responses are quarterly and are not available for the retail trade sector.

Second, the study sheds light on the drivers of the inflation surge in 2022–2023. Contrary to the previous literature on the drivers of the inflation surge episode, and in line with our findings, [Bergholt et al. \(2026\)](#) eliminated uncertainty regarding the deterministic component in historical decomposition in a vector autoregression (VAR) and found that demand shocks were the main drivers of the inflation surge in the euro area. Additionally, [Giannone and Primiceri \(2024\)](#) also found that demand shocks played a key role during the inflation surge in the euro area. This study decomposes firms' selling price expectations into demand and supply components in Slovakia and the euro area, and shows that demand factors prevailed in the services sector throughout the period after 2021. Given the predominant share of services in both Slovakia and the euro area, this may also have driven aggregate results.

Third, the study contributes to the literature on the Phillips curve by estimating it at a sectoral level for a panel of countries, using the demand and supply components of firms' selling price expectations as regressors. The results of the sectoral Phillips curve are consistent with, and complement, those of [Beschin et al. \(2025\)](#). As in their study, we find that economic slack is not statistically significant once country-time fixed effects are included and country-specific macroeconomic shocks are controlled for. Another regional version of the Phillips curve was estimated by [Hazell et al. \(2022\)](#), who found that the Phillips curve is flat and that inflation is more connected to expectations regarding long-run monetary policy and the anchoring of long-run inflation expectations. However, we also demonstrate the importance of sectoral deviations in firms' demand-driven selling price expectations. This suggests a potential channel through which demand shocks can propagate to inflation. Consistent with the finding of [Gagliardone et al. \(2025\)](#) that marginal costs are more closely connected to inflation in the Phillips curve-type relationship than slack, we find that the demand component of selling price expectations is

more closely linked to producer inflation than slack.

This study contributes to the debate on whether the Phillips curve has flattened by demonstrating that the demand component of selling price expectations is robustly linked to producer inflation. [Inoue et al. \(2025\)](#) used a time-varying instrumental variable approach to identify the slope of the Phillips curve. They found that the relationship between unemployment and inflation had weakened, but had strengthened again during the pandemic. [Costain et al. \(2022\)](#) found that the Phillips curve is flatter due to state-dependent nominal stickiness and lower trend inflation. [Hobijn et al. \(2023\)](#) found that the relationship between the unemployment gap and inflation had steepened after 2021. Nevertheless, similar to our findings, [Furlanetto and Lepetit \(2024\)](#) reviewed recent findings regarding the slope of the Phillips curve and concluded that the flattening of the pre-pandemic slope may have been exaggerated.

The remainder of the paper is organised as follows: [Section 2](#) outlines the methodology for decomposing firms' expectations into demand- and supply-side components, [Section 3](#) reports the main findings for Slovakia and the euro area, [Section 4](#) highlights the role of demand- and supply-driven expectations in producer inflation, [Section 5](#) examines how global economic activity and monetary policy shocks affect the demand and supply components of firms' expectations across sectors, and [Section 6](#) concludes.

2. Decomposition of selling price expectations

Since 2002, the Statistical Office of the Slovak Republic, together with the [European Commission \(2026a\)](#), has conducted monthly business surveys of firms in four sectors of the economy: construction, industry, retail trade, and services. The questions relate to firms' past performance and future output, employment, and selling price expectations. One of the questions in the service firm survey asks about demand for their services over the previous three months. Another asks about anticipated demand over the next three months. Questions for manufacturing and retail trade firms focus on past and future production trends and business activity, respectively. Construction firms are asked about business activity trends over the past three months and the current level of orders. All firms are asked about their selling price expectations for the next three months. All answers were normalised, with a value of 1 given to firms expecting an increase, 0 to those expecting no change and -1 to those expecting a decline.

By combining firms' expectations regarding demand in services (business activity, or production trends, respectively, in retail trade and industry¹) and past realisations of demand² (business activity or production trends), alongside their expectations regarding selling price changes, it is possible to categorise

¹ In the construction sector the corresponding question is: the current overall level of your orders is (1) more than sufficient, (2) sufficient/appropriate for the season, (3) insufficient.

² We also use questions about realised demand (business activity or production trends, respectively) in the past three months because firms' selling price expectations for the next three months might be formed based on past realisations of demand. For example, if a firm experienced higher demand in the previous three months, it might want to set higher prices even though it expects lower demand in the next three months. In this case, it might be ambiguous to classify it as an intended price increase due to negative supply factors. Moreover, firms form their beliefs about the future based on recent developments and their expectations of what will happen next (e.g., changes in prices or output). For example, past realisations are used in learning models ([Evans and Honkapohja \(2001\)](#)) to form future expectations.

firms' selling price expectations into demand and supply components³ (see Table 1). For instance, if a firm has experienced positive demand over the past three months and anticipates an increase in demand and selling prices over the next three months, this can be categorised as a positive demand expectation. Conversely, if a firm has experienced lower demand over the past three months and expects demand to decline over the next three months but selling prices to increase, this can be classified as a negative supply expectation. This is because lower demand would normally push prices down. However, the firm may be facing higher input costs or supply chain disruptions, or expect these in the future.

Table 1: Interpretation of demand and price expectations

Demand $t-1 : t-3$	Demand Expectation $t+1 : t+3$	Price Expectation $t+1 : t+3$	Interpreted Type
↑	↑	↑	Positive demand
↓	↓	↓	Negative demand
↑	↑	↓	Positive supply
↓	↓	↑	Negative supply

We employed a continuous version of the demand and supply categorisation system, applying the following formulas:

$$\text{Demand} = \frac{1}{2} \left(P_i + \frac{Q_{i_past_D} + Q_{i_future_D}}{2} \right) \quad (1)$$

$$\text{Supply} = \frac{1}{2} \left(P_i - \frac{Q_{i_past_D} + Q_{i_future_D}}{2} \right), \quad (2)$$

where P_i is an answer regarding expected prices in the next three months. $Q_{i_past_D}$ is an answer regarding demand (production or activity) in the previous three months. $Q_{i_future_D}$ is an answer regarding demand (production or activity) in the next three months. The possible answers are:

- 1: an increase compared to the previous period
- 0: no change compared to the previous period
- -1: a decline compared to the previous period

When a firm expects an increase in future prices and demand and has experienced an increase in past demand (production or business activity, depending on the sector), the demand signal will be 1, whereas the supply signal will be 0. Conversely, if a firm has experienced lower demand and expects lower demand but higher prices, the supply indicator will be equal to 1, but the demand will be 0. We then aggregated the aforementioned demand and supply indicators by survey wave, using specific weights (or no weights) to construct monthly sector-specific demand and supply indicators.

When constructing the sector-level measures by aggregating firms' responses using firm-level weights, equations (1) and (2) are identical to (3) and (4) (see Appendix A for the proof):

³This is similar to the "poor man's sign restrictions" described by Jarociński and Karadi (2020), as well as the sign restrictions outlined by Shapiro (2024).

$$\text{Demand} = \frac{1}{2} (E(P) + E(Q)) \quad (3)$$

$$\text{Supply} = \frac{1}{2} (E(P) - E(Q)) , \quad (4)$$

where $E(P)$ is the weighted balance of selling price expectations, calculated as the weighted share of firms expecting to raise their prices minus the weighted share of firms expecting to lower their prices. $E(Q)$ is the average of the weighted balance of expected demand and the weighted balance of realised demand (production or business activity, depending on the sector). These balances are calculated as the weighted share of firms expecting (or experiencing) higher demand minus the weighted share of firms expecting (or experiencing) lower demand.

Therefore, if the weighting scheme is consistent across the aggregated results, calculating equations (1) and (2) and then aggregating the resulting components for each sector is algebraically equivalent to first aggregating firms' responses to each question, calculating the corresponding sectoral balances, and then applying equations (3) and (4). [Appendix B](#) compares the results obtained by applying equations (1) and (2) to Slovak microdata and subsequently aggregating the resulting components with those obtained by applying equations (3) and (4) to firms' responses aggregated at the sectoral level.

The [European Commission \(2026b\)](#) publishes aggregate results for each answer on its website. Euro area-wide indicators can therefore be computed as weighted averages of national aggregate results for each response. As national aggregate responses depend on country-specific weighting schemes, the area-wide indicator should be interpreted as a weighted average of national signals rather than as a fully harmonised, micro-based measure.

3. Demand- and supply-driven selling price expectations

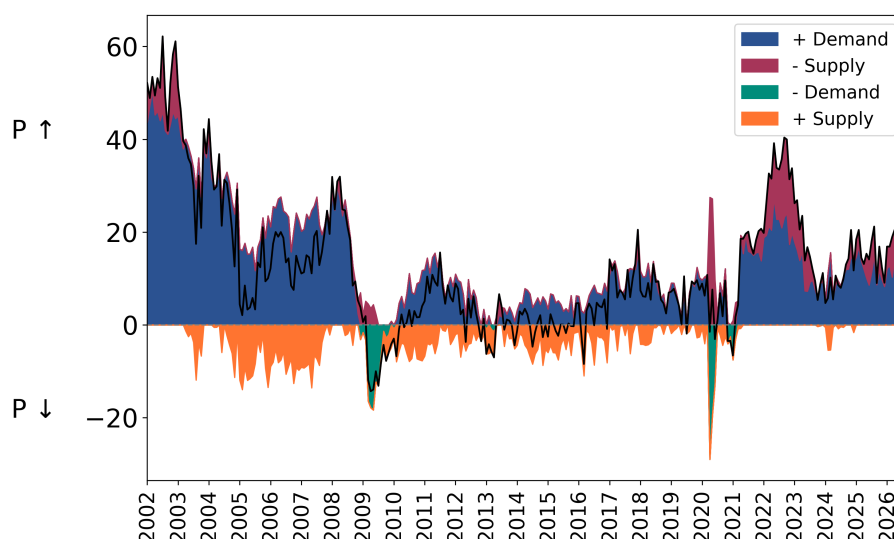
3.1. Results for Slovakia

[Figure 1](#) shows how the aggregated demand and supply components of firms' selling price expectations in Slovakia have changed over time. Prior to the Great Recession of 2008, firms generally had positive demand expectations. This was a period of strong GDP growth and demand in Slovakia. However, demand expectations started to decline sharply in mid-2008 following the onset of the Global Financial Crisis (GFC). At the aggregate level, the positive demand-driven component fell from approximately 27% of turnover-weighted firms in June 2008 to around 7% by October, before turning negative at the end of the year. Negative demand-driven expectations intensified in early 2009, with the aggregate demand-driven component reaching approximately -18% at its trough in May 2009, corresponding to an 18% turnover-weighted share of firms with negative demand-driven expectations. Demand expectations subsequently recovered, with the aggregate demand-driven component gradually returning to positive territory around the beginning of 2010 and increasing somewhat further until mid-2011. Thereafter, it declined again and remained subdued until around 2017.

Another sharp decline in the demand component of price expectations occurred at the beginning of 2020,

amid the uncertainty and lockdowns associated with the pandemic. At the start of the pandemic, firms' selling price expectations showed a sharp decline in the demand component alongside a sharp increase in adverse supply pressures. However, these initial pandemic-induced movements were relatively short-lived. From the beginning of 2021, demand-driven expectations increased sharply, with the aggregate demand-driven component rising from around -8% in January 2021 to approximately 19% by April. It remained elevated thereafter and reached approximately 27% in May 2022, its highest level since 2008. This sharp increase in demand may reflect the unprecedented fiscal support provided during the pandemic, expansionary monetary policy, and the sharp reopening of economies following the start of vaccination programmes (in line with recent research by [Giannone and Primiceri \(2024\)](#) on the drivers of inflation surges). At the end of 2021 and the beginning of 2022, elevated positive demand-driven selling price expectations coincided with a sharp increase in adverse supply-driven expectations. At the aggregate level, the magnitude of the negative supply-driven component increased from approximately 7% of turnover-weighted firms in December 2021 to more than 11% in March 2022, reaching a maximum of approximately 17% in September 2022. Although substantial, this remained well below the peak of approximately 27.5% recorded during the COVID-19 pandemic in April 2020.

Figure 1: Demand and supply components of firms' selling price expectations in Slovakia⁴



Source: Statistical Office of the Slovak Republic (SU SR) (2026) and author's calculations.

Seasonally adjusted. Weighted using turnover weights at the firm level and gross value added ([Eurostat, 2026](#)) at the sectoral level for the whole economy. The industrial sector accounts for 29% of the value added, the construction sector for 8%, the retail trade sector for 13%, and the services sector for 50%.

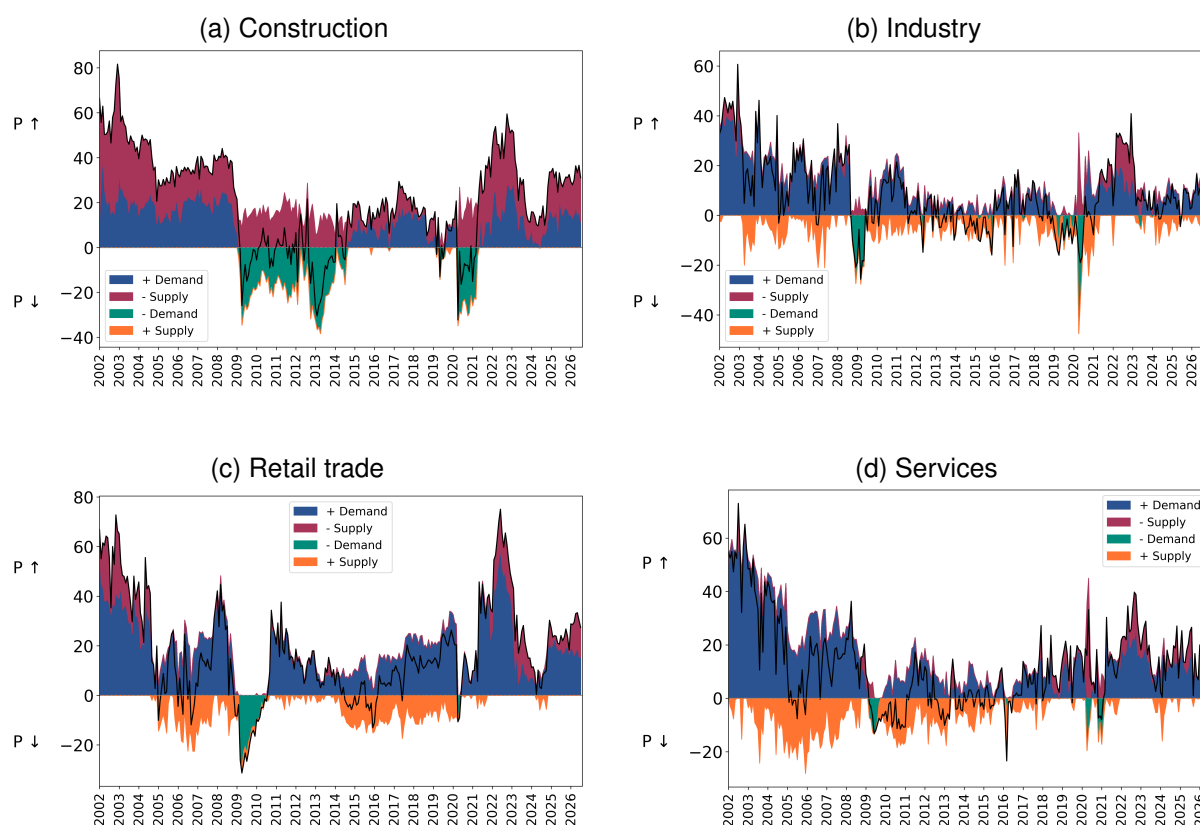
The decomposition of selling price expectations reveals substantial changes in the relative importance of demand- and supply-side factors over time (see [Figure 2](#)). In the construction sector (see [Figure 2 \(a\)](#)), positive demand-driven expectations occurred alongside negative supply-driven expectations from 2002 to mid-2008, from mid-2014 to 2019, and from mid-2021 onwards. Thus, during these periods, firms expected higher selling prices, which were associated with both higher and lower demand. Supply-side

⁴The signs of the components reflect the direction in which they are plotted rather than the sign of the underlying turnover-weighted shares, which are non-negative. Positive demand-driven and negative supply-driven expectations are plotted above zero because both are associated with higher selling price expectations, whereas negative demand-driven and positive supply-driven expectations are plotted below zero because both are associated with lower selling price expectations. Thus, for example, a negative demand-driven component of -18% represents an 18% turnover-weighted share of firms, while a negative supply-driven component of 18% is plotted with a positive sign.

factors were particularly significant from 2002 to 2014 and from 2020 onwards. Between 2009 and 2015, and again from the first quarter of 2020, both components were negative. In contrast, the period from 2015 to 2019 was characterised mainly by positive demand-driven selling price expectations, which also prevailed in the second half of 2019.

Between 2002 and 2008, developments in selling price expectations in industry, retail trade, and services were largely associated with positive demand-side conditions (Figure 2 (b–d)). Firms generally reported stronger demand and expected it to increase while also anticipating higher selling prices. Retail trade was an exception during 2002–2004, when the magnitude of the negative supply-driven component of selling price expectations was also particularly large. From 2005 to 2008, the positive supply-driven component strengthened, particularly in retail trade and services, suggesting that a considerable share of firms anticipated lower selling prices despite stronger demand conditions. This pattern changed markedly around mid-2008. The positive demand-driven component fell sharply and moved into negative territory in industry, retail trade, and services. The negative demand-driven component was most pronounced in retail trade and industry, reaching approximately -28% in both sectors, compared with around -13.5% in services.

Figure 2: Demand and supply components of firms' selling price expectations across sectors in Slovakia (aggregated using turnover weights)



Notes: Seasonally adjusted.

Source: Statistical Office of the Slovak Republic (SU SR) (2026) and author's calculations.

The subsequent recovery varied by sector. In retail trade (see Figure 2 (c)), positive demand-driven selling price expectations predominated from the second half of 2010 until 2020, although their magnitude weakened during 2012–2016. In industry and services (see Figure 2 (b) and (d)), the proportion of firms with positive demand-driven selling price expectations increased from mid-2009 to early 2011. It

subsequently declined and remained subdued until early 2016 in industry and mid-2016 in services. The prolonged weakness therefore coincided first with the euro area sovereign debt crisis and subsequently with the euro area's low-inflation period.

At the start of the pandemic, negative supply factors hit the industrial and services sectors hardest, reaching their highest magnitude for these sectors since 2002. The construction sector also experienced high negative supply, comparable to that experienced during the Great Recession and the European sovereign debt crisis. However, the impact of negative supply factors on these sectors in 2020 was short-lived. At the beginning of 2020, the construction, industrial and services sectors were also characterised by strong negative demand factors. In the industrial and services sectors, the magnitude of negative demand reached its highest level since 2002. By contrast, the negative demand-driven component of selling price expectations in the construction sector was similar in magnitude to that seen between 2009 and 2014. At the start of the pandemic, the retail trade sector experienced a relatively small decline in demand, which turned positive shortly afterwards, whereas demand remained negative in other sectors. This may partly reflect continued opening of grocery stores and the availability of online shopping.

As early as the second half of 2020, firms in industry and retail trade began to report positive demand-driven selling price expectations. From 2021 onwards, this was followed by positive demand-driven selling price expectations in services and construction. During 2021–2023, the positive demand-driven component reached approximately 59% of turnover-weighted firms in retail trade, 30% in services, 29% in construction, and 21% in industry. These levels were particularly notable in retail trade, where the component reached its highest level since 2002, in services, where it reached its highest level in approximately 13 years, and in construction, where it reached its highest level in around 20 years. In industry, positive demand-driven expectations also remained elevated, although their magnitude did not exceed the levels observed in 2020. These developments coincided with substantial fiscal support during the pandemic, accommodative monetary policy and the reopening of the economy in 2021, as vaccinations progressed and restrictions on contact-intensive activities were gradually lifted.

Additionally, the construction sector exhibited a persistent negative supply-driven component of selling price expectations from 2020 to 2026. From 2022 to 2023, negative supply-driven components also became apparent in industry, retail trade and services, consistent with the sharp increase in input and energy costs during this period. The magnitude of the negative supply-driven component peaked at approximately 33% of turnover-weighted firms in construction in July 2022, 25% in industry in December 2022, 20% in retail trade in February 2023, and 18% in services in September 2022. In construction, this was the highest level since 2004, while in retail trade it was the highest since 2003. In industry and services, adverse supply pressures exceeded their pre-pandemic peaks but remained below the exceptionally high levels recorded during the first wave of the pandemic.

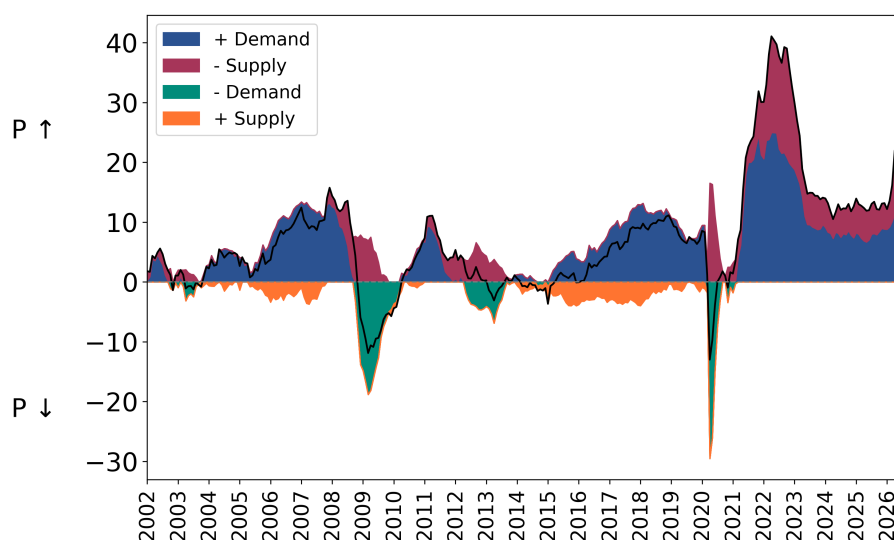
3.2. Results for the euro area

Figure 3 presents the demand- and supply-driven components of firms' selling price expectations for the euro area over time. From mid-2005 until 2008, selling price expectations were predominantly characterised by a positive demand-driven component. During 2008, a negative supply-driven component emerged, while the positive demand-driven component declined sharply, coinciding with the Global Financial Crisis (GFC). During the GFC, firms' selling price expectations were characterised by pronounced negative demand- and supply-driven components. The negative supply-driven component peaked at approximately 8% of turnover-weighted firms in December 2008, while the negative demand-driven component continued to intensify, reaching approximately -19% in March 2009, corresponding to

a 19% turnover-weighted share of euro area firms with negative demand-driven expectations. From mid-2009 onwards, the magnitude of these negative components began to diminish, and positive demand-driven selling price expectations re-emerged by mid-2010 and persisted until 2012, coinciding with the initial recovery from the GFC. Between 2012 and 2014, negative demand- and supply-driven components again predominated, a period encompassing the later stages and aftermath of the euro area sovereign debt crisis. From 2015 onwards, positive demand-driven selling price expectations began to re-emerge.

At the start of the pandemic, negative demand-driven expectations were substantially stronger than during 2008–2010 and were accompanied by a sharp increase in negative supply-driven expectations. During the first wave of the pandemic, the negative demand-driven component peaked at approximately -30% in April 2020, corresponding to a 30% turnover-weighted share of euro area firms with negative demand-driven expectations, while the negative supply-driven component reached around 17%. However, these negative expectations were short-lived compared with those observed during the 2008–2010 and 2012–2014 periods. By June 2020, the negative demand- and supply-driven components had already declined to approximately -15% and 11%, respectively, with the demand-driven component returning close to zero by September.

Figure 3: Demand and supply components of firms' selling price expectations in the euro area (aggregated using country-specific weights (European Commission, 2026b))⁵



Source: European Commission (2026a) and author's calculations.

Seasonally adjusted. Weighted using country-specific weights (European Commission, 2026b), country weights for the euro area (European Commission, Directorate-General for Economic and Financial Affairs, 2025) and gross value added (Eurostat, 2026) at the sectoral level. The industrial sector accounts for 23% of the value added, the construction sector for 5%, the retail trade sector for 14%, and the services sector for 58%.

By the second half of 2021, firms had elevated positive demand-driven expectations, accompanied by increasingly negative supply-driven expectations. This was likely due to the rapid reopening of economies

⁵The signs of the components reflect the direction in which they are plotted rather than the sign of the underlying turnover-weighted shares, which are non-negative. Positive demand-driven and negative supply-driven expectations are plotted above zero because both are associated with higher selling price expectations, whereas negative demand-driven and positive supply-driven expectations are plotted below zero because both are associated with lower selling price expectations. Thus, for example, a negative demand-driven component of -18% represents an 18% turnover-weighted share of firms, while a negative supply-driven component of 18% is plotted with a positive sign.

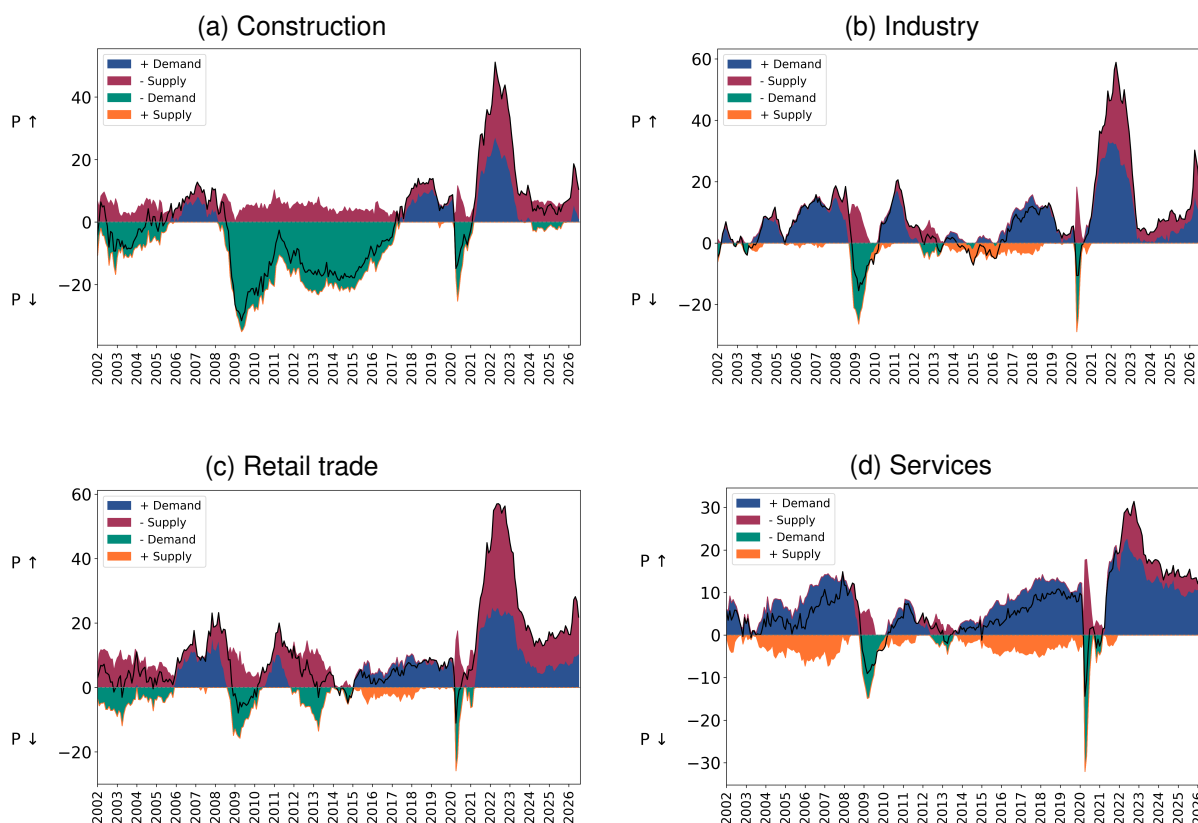
and higher energy prices. It was not until 2023 that the positive demand- and negative supply-driven components of firms' selling price expectations began to decrease. Between 2021 and 2023, the positive demand- and negative supply-driven components of firms' selling price expectations in the euro area reached their highest magnitudes since the beginning of the sample in 2002. The positive demand-driven component peaked at approximately 25% of turnover-weighted firms in April 2022, while the negative supply-driven component reached a peak of around 18% in October 2022. While both positive demand and negative supply factors pushed firms' selling price expectations upwards, positive demand-driven expectations prevailed. This aligns with recent findings on the sources of the inflation surge in the euro area (see Battistini and Neves (2026), Bergholt et al. (2026), Giannone and Primiceri (2024), Gudmundsson et al. (2024)). The importance of the demand component of firms' selling price expectations during the 2021–2023 inflation surge can be explained by the high proportion of services in the euro area economy (accounting for around 58% of value added), with the services sector experiencing much higher positive demand-driven selling price expectations during this period (see Figure 4 (d)). At the start of 2026, there was an increase in the negative, supply-driven component of euro area firms' selling price expectations. This coincided with a surge in energy prices in 2026.

Figure 4 presents the demand- and supply-driven decomposition of euro area firms' selling price expectations in different sectors of the economy. In general, construction firms exhibited negative demand-driven selling price expectations from 2002 to mid-2005 and during much of the period following the Great Recession and preceding the pandemic (green area in Figure 4 (a)). The negative demand-driven component was particularly pronounced during the Great Recession and its immediate aftermath. By contrast, positive demand-driven selling price expectations were evident during 2006–2008, 2017–2020, and 2021–2023. Construction firms also exhibited negative supply-driven selling price expectations during much of the pre-pandemic period (red area), although these were generally smaller in magnitude than the negative demand-driven component. At the onset of the pandemic, the negative demand-driven component again predominated, although its magnitude did not exceed that observed during 2009–2010. The period 2021–2023 stands out in comparison with earlier episodes. The positive demand-driven component of selling price expectations in construction reached its highest magnitude since 2002, peaking at approximately 27% of firms in April 2022, compared with a maximum of around 11% before 2021. At the same time, the negative supply-driven component also reached its highest magnitude since 2002, peaking at approximately 24% in April 2022, compared with a pre-2021 maximum of around 12%. Thus, unusually strong positive demand-side pressures coincided with pronounced negative supply-side pressures, with both components contributing to higher selling price expectations.

Figure 4 (b) presents the demand- and supply-driven components of selling price expectations of euro area firms in the industrial sector. During the Great Recession, firms' selling price expectations reflected both negative demand- and supply-driven components, with the former contributing to lower selling price expectations and the latter to higher ones. The positive demand-driven component increased from the beginning of 2010 until early 2011, after which it declined and remained at very low levels until early 2017. During the first wave of the pandemic, negative demand- and supply-driven components were again present, exerting opposing effects on selling price expectations. From 2021 to 2023, positive demand-driven expectations were accompanied by an increasingly pronounced negative supply-driven component, with both contributing to higher selling price expectations. As in construction, the magnitudes of both components during the post-pandemic period exceeded those observed at any previous point since the beginning of the sample in 2002. The positive demand-driven component peaked at approximately 34% of firms in November 2021, almost twice its pre-2021 maximum of around 17%, while the negative supply-driven component reached approximately 26% in April 2022, compared with a previous peak of around 18% in April 2020. From 2023 to mid-2024, both the positive demand-driven and

negative supply-driven components diminished in magnitude. Both components increased moderately thereafter until the beginning of 2026, when the negative supply-driven component began to intensify. This acceleration coincided with an energy supply shock in 2026.

Figure 4: Demand and supply components of firms' selling price expectations across sectors in the euro area (aggregated using country-specific weights (European Commission, 2026b))



Notes: Seasonally adjusted.

Source: European Commission (2026a) and author's calculations.

Figure 4 (c) presents the demand- and supply-driven components of selling price expectations of euro area firms in the retail trade sector. Positive demand-driven selling price expectations predominated from 2006 to mid-2008, and again from mid-2010 to mid-2011. The former corresponded to the pre-Global Financial Crisis (GFC) period, while the latter reflected the initial recovery following the GFC. During the Great Recession, retail trade firms predominantly experienced weaker demand and expected it to remain subdued. At the same time, they reported both higher and lower selling price expectations. This was reflected in negative demand- and supply-driven components, which had opposing effects on selling price expectations. From mid-2011 to 2014, the negative supply-driven component became particularly pronounced. At the same time, the negative demand-driven component re-emerged, coinciding broadly with the euro area sovereign debt crisis.

During the first wave of the pandemic, the negative demand component of retail trade firms' selling price expectations in the euro area was greater in magnitude than in the 2008–2010 and 2012–2014 periods. These negative demand factors were accompanied by negative supply factors, albeit smaller in magnitude. From 2021 onwards, the magnitudes of the positive demand- and negative supply-driven components increased sharply, reaching their highest levels in the retail trade sector since the beginning of the sample in 2002. The positive demand-driven component peaked at approximately 25% of

firms in February 2022, compared with a pre-2021 maximum of around 16%, while the negative supply-driven component reached approximately 34% in July 2022, almost twice its previous peak of around 18%. Notably, the negative supply-driven component substantially exceeded the positive demand-driven component during much of this period. As in other sectors of the economy, both components began to decline in 2023. However, the negative supply-driven component has remained relatively elevated compared with historical levels. From mid-2024, both the positive demand and negative supply components of firms' selling price expectations increased gradually. However, at the beginning of 2026, the negative supply component increased sharply for a few months and then started to decline.

Figure 4 (d) illustrates the evolution of the demand- and supply-driven components of selling price expectations of firms in the euro area services sector. From 2004 to mid-2008, positive demand-driven selling price expectations predominated in the services sector, accompanied by a positive supply-driven component. However, this pattern changed sharply in mid-2008, when the negative demand-driven component became predominant and was accompanied by a negative supply-driven component. From mid-2009 onwards, both negative components began to diminish in magnitude. From mid-2010 to mid-2011, the positive demand-driven component again predominated, although its magnitude remained below that observed during 2004–2008. From mid-2011 to 2015, both the demand- and supply-driven components of selling price expectations remained small. The latter part of this period coincided with the emergence of a prolonged low-inflation environment in the euro area.

During the first wave of the pandemic, the negative demand-driven component was more pronounced in services than in any other sector and substantially exceeded its magnitude during the Great Recession. This likely reflected the particularly strong impact of lockdowns on service firms during the first wave of the pandemic. Starting in mid-2021, coinciding with the reopening of economies following the rollout of vaccinations and a recovery in demand for services, the positive demand-driven component of service firms' selling price expectations increased markedly. This was accompanied by a rise in the negative supply-driven component towards the end of 2021 and into 2022. The positive demand-driven component reached approximately 22% of firms in May 2022, its highest magnitude since the beginning of the sample in 2002, while the negative supply-driven component reached approximately 12%, remaining below its peak of around 18% during the first wave of the pandemic. From 2023 onwards, the two components followed somewhat different trajectories: the negative supply-driven component declined substantially, whereas the positive demand-driven component decreased more gradually and remained relatively elevated.

Appendix C presents alternative decomposition results where either $Q_{i,past_D}$ or $Q_{i,future_D}$ is dropped from the decompositions in equations (3) and (4). This demonstrates the robustness of the results when either future demand expectations or realised past demand are excluded.

3.3. What the decompositions show

Do these firms' selling price expectation decompositions actually resemble demand and supply shocks at the sectoral level? Demand shocks should move prices and quantities in the same direction, whereas supply shocks should move them in opposite directions.

To address this question, we can use a structural vector autoregression (SVAR) model with Cholesky identification to analyse firms' price expectations alongside industrial production (IP) and the harmonised index of consumer prices (HICP) at the country level. We use data for Slovakia and the euro area to perform a robustness check. Data for Slovakia are obtained from Národná banka Slovenska (NBS)

(2026), and data for the euro area are obtained from Eurostat (2026). The variables have been seasonally adjusted, whereas IP and the HICP have been additionally transformed by taking natural logarithms and multiplying by 100. The variables are ordered as follows: a component (either demand or supply) of firms' price expectations in one sector, industrial production, and the HICP. As the data are monthly, twelve lags of the variables are used, along with the standard Normal-inverse-Wishart Minnesota-style hyperparameters. We ran 10,000 iterations after 5,000 burn-in iterations. The model was estimated using the BEAR toolbox (Alistair and van R. Björn, 2016). The estimated period is 2002M1:2025M12.

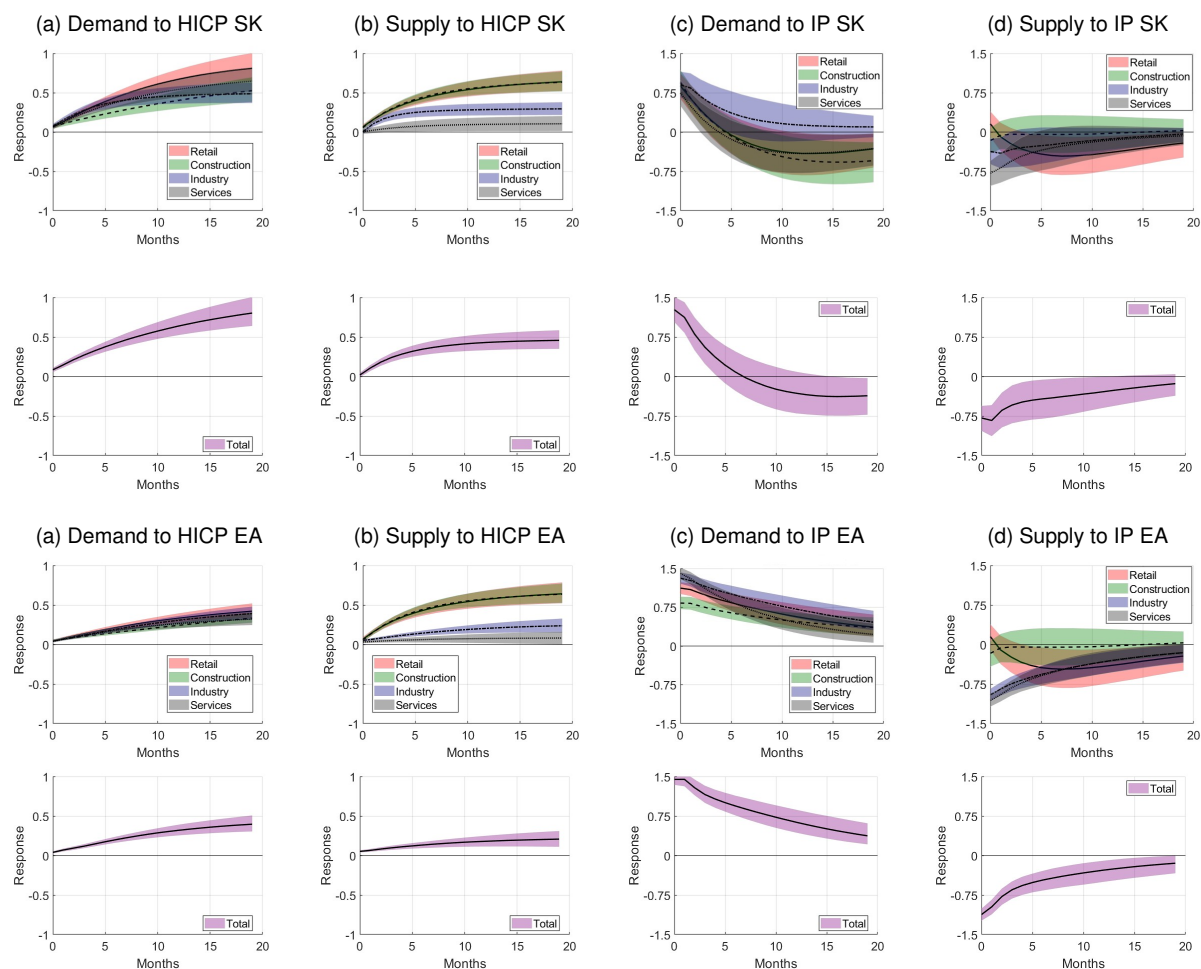
Figure 5 shows the impact of structural shocks (based on demand and supply factors ordered first in the Cholesky SVAR) on the harmonised index of consumer prices (HICP) (panels (a) and (b)) and industrial production (panels (c) and (d)) in Slovakia (top two rows) and the euro area (bottom two rows). A structural shock that has a contemporaneous impact on the demand-driven component of firms' selling price expectations in a given sector, as well as on industrial production and HICP, has a positive effect on HICP in both Slovakia and the euro area (panel (a) of Figure 5), although the magnitude of the effect is smaller in the euro area. Structural shocks identified with the construction and industrial sectors' demand components ordered first lead to a gradual increase in HICP in Slovakia (panel (a) of Figure 5, first row), starting with an initial impact of around 10 basis points and rising to between 30 and 50 basis points within five months. This is followed by a slow but steady increase over the longer term. The effects are somewhat stronger for structural shocks identified using the demand components of the services and retail trade sectors ordered first in Slovakia. Following an initial increase of around 10 basis points, HICP rises by approximately 40–80 basis points after five months, continuing to increase gradually thereafter. In Slovakia, a one standard deviation structural shock identified with the aggregate demand component ordered first (panel (a) of Figure 5, second row) has an effect similar to that of a shock identified with the services sector demand component, possibly reflecting the importance of the services sector in the Slovak economy, where it accounts for 50% of value added.

In the euro area (panel (a) of Figure 5, third row), the HICP responses to structural shocks identified with the demand-driven components of firms' selling price expectations are similar in shape but smaller in magnitude. The initial impacts are around 5 basis points, increasing to approximately 20 basis points after five months and reaching around 40 basis points in the long term. A structural shock identified with the aggregate demand component of firms' selling price expectations ordered first in the euro area (panel (a) of Figure 5, fourth row) has effects similar to those identified with the sectoral demand components.

Structural shocks that have a contemporaneous impact on the supply-side component of firms' selling price expectations in a given sector, as well as on HICP and industrial production (panel (b) of Figure 5), have a stronger effect on HICP in Slovakia and the euro area when identified with the supply components for the retail trade and construction sectors than when identified using the corresponding components for industry and services. Starting from an initial increase of around 10 basis points in both Slovakia and the euro area, the structural shocks identified using the supply components of the retail trade and construction sectors lead to an increase in HICP of approximately 50 basis points within 5–20 months after the shock. By comparison, the increase is about 20 basis points over the same horizon for a structural shock identified using the supply component of the industrial sector, and about 10 basis points for a structural shock identified using the supply component of the services sector. The effect of a structural shock identified with the aggregate supply-side component ordered first on Slovak and euro area HICP is around twice as strong in Slovakia as in the euro area: it leads to a long-term increase in HICP of 50 basis points in Slovakia, compared with around 20 basis points in the euro area. This may be explained by the higher share of the services sector in value added in the euro area (58% compared with 50% in Slovakia), and the lower share of industry and construction in the euro area compared with

Slovakia (28% compared with 37%).

Figure 5: The effects of demand and supply components of firms' price expectations



Notes: pink, green, grey, blue and purple areas represent 68% credible sets.

A structural shock that has a contemporaneous impact on the demand-driven component of firms' selling price expectations in a given sector, as well as on industrial production and HICP, has a positive effect on industrial production in Slovakia and the euro area (panel (c) of Figure 5). However, in both cases, the effect is strongest when the structural shock is identified with the demand component of industrial firms' selling price expectations ordered first. In Slovakia, the response of industrial production to the structural shock identified with the demand component of industrial firms' selling price expectations ordered first persists for up to 20 months, starting with an increase of about 80 basis points on impact and gradually declining over time. When the demand components of selling price expectations in the service, construction, and retail trade sectors are ordered first, the responses are similar in shape but decay much more quickly, within three to four months, compared with the specification where the demand component of industrial firms' selling price expectations is ordered first in the SVAR.

In the euro area, the impact on industrial production is largest when the demand components of selling price expectations in the industrial and services sectors are ordered first in the VAR (panel (c) of Figure 5, third row). The corresponding structural shocks lead to an increase of approximately 1.5 percent in

industrial production on impact, with the effect declining gradually but remaining positive at around 50 basis points even 20 months after the shock. For comparison, the response is about half as large when the demand component of the construction sector is ordered first and about two-thirds as large when the demand component of the retail trade sector is ordered first.

A structural shock identified with the aggregate demand-side component of firms' selling price expectations ordered first has a more persistent positive effect on industrial production in the euro area than in Slovakia (panel (c) of [Figure 5](#), second and fourth rows). This is consistent with the more persistent effects and higher impact magnitudes of the structural shocks identified using the sectoral demand components on euro area industrial production.

A structural shock that has a contemporaneous impact on the supply-side component of firms' selling price expectations in a given sector, as well as on industrial production and HICP, has a negative effect on industrial production in Slovakia and the euro area (panel (d) of [Figure 5](#)). However, the structural shock identified with the construction sector's supply component ordered first has only a small negative impact effect on industrial production.

In Slovakia, structural shocks identified with the supply components of firms' selling price expectations in the industrial and services sectors ordered first have the strongest negative effect on industrial production, with declines of approximately 75 and 30 basis points on impact, respectively. This is followed by a gradual adjustment, with industrial production stabilising at a decline of around 40 basis points over a horizon of 5 to 10 months after the shock (panel (d) of [Figure 5](#), first row). The results for the euro area are broadly similar: the largest negative impact on industrial production is observed when the supply components of firms' selling price expectations in the industrial and services sectors are ordered first, leading to an initial decline in industrial production of around 90 basis points, followed by a gradual attenuation of the effect (panel (d) of [Figure 5](#), third row).

By contrast, when the supply-side component of firms' selling price expectations in the retail trade sector is ordered first in the SVAR, the corresponding structural shock produces a more persistent effect on industrial production in both Slovakia and the euro area, with similar magnitudes. Specifically, a one standard deviation structural shock leads to a decline of around 40 basis points in industrial production three months after the shock, with the effect persisting for approximately twenty months.

A structural shock identified with the aggregate supply-side component of firms' selling price expectations ordered first has a stronger negative effect on industrial production in the euro area than in Slovakia, while its longer-term effects are quite similar (panel (d) of [Figure 5](#), second and fourth rows).

Overall, structural shocks identified with the demand components of firms' selling price expectations ordered first have a stronger positive effect on HICP in Slovakia than in the euro area, but a shorter-lived positive effect on industrial production. At the same time, structural shocks identified with the supply components of firms' selling price expectations ordered first have a larger positive effect on HICP in Slovakia than in the euro area, but a smaller negative effect on industrial production.

4. Sectoral Phillips curve

4.1. Demand- and supply-driven selling price expectations and the Phillips curve

The demand and supply components of firms' selling price expectations may provide additional channels through which demand and supply shocks are transmitted to inflation. The demand component may serve as a measure of economic slack: when the economy is overheating, firms expect stronger demand and may consequently raise their selling prices. The supply component, in turn, may capture supply-side factors that are otherwise omitted from Phillips curve regressions. Since adverse supply shocks raise inflation while reducing economic activity, their omission may lead to a downward bias in the estimated coefficient on economic slack. Since the Phillips curve equation is based on firms' optimisation problems with regard to their price expectations, it is possible to use the decomposition of firms' selling price expectations in the estimation of the Phillips curve at the sectoral level. Therefore, we use the following specification:

$$y_{i,s,t} = \beta_1 y_{i,s,t-1} + \beta_2 x_{i,s,t-1} + \beta_3 D_{i,s,t-1} + \beta_4 S_{i,s,t-1} + \gamma_{i,s} + \delta_{i,t} + \varepsilon_{i,s,t} \quad (5)$$

where $y_{i,s,t}$ is the year-on-year gross value added (GVA) deflator or producer price index at the sectoral level, aggregated as described below, $x_{i,s,t-1}$ is a measure of economic slack at the sectoral level, and $D_{i,s,t-1}$ and $S_{i,s,t-1}$ are the demand and supply components of firms' selling price expectations. The terms $\gamma_{i,s}$ and $\delta_{i,t}$ denote country-sector and country-quarter fixed effects, respectively. Therefore, the equation allows us to examine whether the lagged demand and supply components of firms' selling price expectations help explain differences in producer price inflation across sectors within each country, conditional on inflation persistence and the included fixed effects.

The closest specification can be found in [Ari et al. \(2023\)](#), where the authors estimated sectoral Phillips curves at a disaggregated level. Depending on the specification, they included country and sector fixed effects or country-sector fixed effects, together with time fixed effects and lagged inflation. They also employed sectoral implied GDP deflators to measure sectoral inflation and Hodrick-Prescott filtered real gross value added to measure sectoral output gaps. Our specification differs in its fixed-effects structure by including country-time fixed effects, which absorb factors common to all sectors within a country at a given point in time, including aggregate macroeconomic conditions and shocks. Consequently, identification in our specification relies on sector-specific variation within countries at a given point in time, net of aggregate country-level factors. This also implies that variables that vary only at the country-time level, such as aggregate inflation expectations, cannot be identified separately in our specification, whereas [Ari et al. \(2023\)](#) can include such variables directly.

Several other studies have also estimated Phillips curve relationships at a disaggregated level. For instance, [Imbs et al. \(2011\)](#) estimated an industry-level Phillips curve separately for each sector using French data, thereby exploiting time-series variation within individual sectors. Their specification included lagged inflation and used sectoral labour shares as a proxy for marginal costs. They found that marginal costs were statistically significantly associated with inflation, similarly to [Gagliardone et al. \(2025\)](#). [Gudmundsson et al. \(2024\)](#) estimated panel Phillips curve regressions separately for goods, services, and core inflation. This study exploited variation across countries and over time within each

inflation category, including country fixed effects, lagged inflation, and time-varying aggregate variables such as inflation expectations. [Smith et al. \(2025\)](#) estimated Phillips curves for industry components of personal consumption expenditure, exploiting variation across industry components and over time and including industry-component and time fixed effects. Both studies used contemporaneous values of the unemployment rate or unemployment gap as a measure of slack, while [Smith et al. \(2025\)](#) additionally included a lagged value of the unemployment gap. Finally, [Luengo-Prado et al. \(2018\)](#) examined the relationship between aggregate contemporaneous unemployment and disaggregated US inflation, exploiting variation across sectors and over time while accounting for sector-specific fixed effects and lagged inflation. In contrast, our specification exploits sector-specific variation within the same country and time period, with country-time fixed effects absorbing country-specific conditions and shocks common across sectors. Depending on the specification, sector- or country-sector fixed effects also account for persistent heterogeneity across sectors or country-sector pairs.

There is no direct indicator of economic slack at the sectoral level. However, the study by [Barnichon and Shapiro \(2024\)](#) found that labour market tightness might be one of the best indicators of economic slack. Several possible proxies are available at the sectoral level. The first of these is the growth rate of the wages and salaries component of the Labour Cost Index (LCI), as higher growth in LCI wages might indicate tighter labour markets. Another proxy is the growth rate of the number of vacancies in a particular sector, which should also be positively correlated with labour market tightness. Based on the assumption that tighter labour markets generate stronger hourly wage growth, we use seasonally and calendar-adjusted data on the wages and salaries component of the Labour Cost Index (LCI), obtained from [Eurostat \(2026\)](#), as a proxy for labour market tightness. To ensure consistency with the sectoral classification used throughout the analysis, the correspondence between NACE Rev. 2 sections and sectors is defined as follows:

- Industry: B, C, D, E
- Construction: F
- Retail trade: G
- Services: H, I, J, K, L, M, N, R, S

When an aggregated NACE Rev. 2 classification is available, such as B–E or M_N, and corresponds to a sector or its constituent sections, we use the aggregated classification. For example, B–E is preferred to the separate observations for B, C, D and E when both are reported. If both an aggregate code and its constituent subcategories are available, only the most aggregated, non-overlapping code is retained.

After assigning NACE Rev. 2 sections to each sector, sector-level indices for wages and salaries are calculated as:

$$LCI_{s,t} = \frac{1}{|\mathcal{I}_s|} \sum_{i \in \mathcal{I}_s} LCI_{i,t}, \quad (6)$$

where $LCI_{i,t}$ denotes the wages and salaries component of the Labour Cost Index for NACE Rev. 2 section i at time t , and $\mathcal{I}_s$ denotes the set of NACE Rev. 2 sections assigned to sector s . The resulting series are converted to quarterly frequency, after which year-on-year growth rates are computed for each country and sector.

As an alternative measure of labour market tightness, we use the growth rate of sectoral job vacancies obtained from [Eurostat \(2026\)](#). The sample is restricted to seasonally adjusted observations, and the

total number of vacancies is aggregated using the same NACE Rev. 2 sectoral mapping described above. After assigning NACE Rev. 2 sections to each sector, sector-level vacancy counts are calculated by summing job vacancies across all retained NACE Rev. 2 sections:

$$VAC_{s,t} = \sum_{i \in \mathcal{I}_s} JV_{i,t}, \quad (7)$$

where $JV_{i,t}$ denotes the number of job vacancies in NACE Rev. 2 section i at time t , and $\mathcal{I}_s$ denotes the set of NACE Rev. 2 sections assigned to sector s . We then calculate the year-on-year growth rates of quarterly vacancies for each country and sector.

As the main measure of producer inflation, we use sectoral deflators constructed from quarterly national accounts data from Eurostat (2026). The dataset provides gross value added (GVA) by sector in both current prices (CP) and chain-linked volumes (CLV). The analysis uses seasonally and calendar-adjusted data and focuses on gross value added. Several issues arise when mapping NACE Rev. 2 sections to the sectoral aggregates. In particular, an aggregated NACE Rev. 2 classification is available for G–I, but separate data for G (wholesale and retail trade) are not available. We therefore approximate G by taking one-third of G–I, while the services aggregate is constructed using the remaining two-thirds of G–I together with J, K, L, and M_N. Formally, sectoral gross value added is computed as a weighted sum of the underlying NACE Rev. 2 components, separately for current-price data (CP) and chain-linked volume data (CLV):

$$GVA_{s,t} = \sum_{i \in \mathcal{I}_s} w_{i,s} \cdot GVA_{i,t}, \quad (8)$$

where $GVA_{i,t}$ denotes GVA in NACE Rev. 2 section i at time t , $w_{i,s}$ denotes the predefined weight assigned to section i within sector s (equal weights in our case), and $\mathcal{I}_s$ denotes the set of NACE Rev. 2 sections belonging to sector s .

Sectoral deflators are obtained as implicit price deflators, defined as the ratio of nominal to real GVA:

$$Deflator_{s,t} = 100 \times \frac{GVA_{s,t}^{CP}}{GVA_{s,t}^{CLV}}, \quad (9)$$

where $GVA_{s,t}^{CP}$ is sectoral GVA in current prices and $GVA_{s,t}^{CLV}$ is sectoral GVA in chain-linked volumes (reference year 2020). The resulting deflators are expressed as index numbers (base year = 2020).

As a robustness check, we replace the constructed price deflator, calculated as the ratio of nominal to real gross value added (GVA), with implicit sectoral price deflators. As with the baseline specification, the series are restricted to seasonally and calendar-adjusted gross value added observations. After NACE Rev. 2 sections have been assigned to sectors and the aggregate-preference rule has been applied, sectoral deflators are computed as the arithmetic mean of all available price indices within a given country-sector pair:

$$Deflator_{s,t}^{alt} = \frac{1}{N_{s,t}} \sum_{i \in \mathcal{I}_s} PD_{i,t}, \quad (10)$$

where $PD_{i,t}$ denotes the Eurostat price index for NACE Rev. 2 section i at time t , $\mathcal{I}_s$ denotes the set of NACE Rev. 2 sections assigned to sector s , and $N_{s,t}$ denotes the number of available section-level observations for sector s in quarter t .

An alternative measure of firms' inflation is to use producer price indices for each sector. For the retail

trade sector in particular, an implicit price proxy is constructed from quarterly retail trade turnover data from Eurostat (2026). We used seasonally and calendar-adjusted observations, combining series reported under the I15 and I21 index bases. Since the underlying index reference changes over time, the earlier I15 series is rebased so that 2021Q1 equals 100:

$$I15_{i,t}^{rebased} = 100 \times \frac{I15_{i,t}}{I15_{i,2021Q1}} \quad (11)$$

The rebased I15 series is then merged with the I21 series, using I15 up to 2020Q4 and I21 from 2021Q1 onwards.

The implicit retail trade price index is then computed as:

$$PPI_{s,t}^R = 100 \times \frac{NETTUR_{s,t}}{VOL_SLS_{s,t}}, \quad (12)$$

where $NETTUR_{s,t}$ is nominal turnover and $VOL_SLS_{s,t}$ is volume of sales. The series are then transformed into year-on-year quarterly growth rates.

Alternative price indicators for the other sectors are obtained from Eurostat (2026). The producer price index for the domestic market is used as a producer inflation proxy for industry, while the harmonised index of consumer prices (HICP) is used for services and the construction producer price index is used for construction. All indices were further seasonally adjusted. The producer price index for the domestic market and the HICP for services were aggregated at quarterly frequency using the mean of the monthly observations. Quarterly year-on-year growth rates were then calculated for each series.

The empirical analysis is based on two quarterly country-sector panel datasets covering 29 countries, comprising 28 European economies and Türkiye (Turkey). Both the GVA and PPI datasets span the period from 2002Q2 to 2026Q2 for most countries, although data availability for Cyprus, Croatia, Ireland, Lithuania, Malta, Romania, Serbia and Türkiye begins later. Both datasets are constructed at a quarterly frequency. The time dimension of the GVA dataset varies substantially across countries. The calendar span ranges from 27 quarters in Ireland to 97 quarters for countries with the longest coverage, corresponding to approximately 7 to 24 years of data. The dataset is predominantly characterised by a four-sector disaggregation, with Luxembourg being the only country represented by two sectors. Consequently, the total number of country-sector observations ranges from 108 in Ireland to 388 in Slovakia. Seven country panels are fully balanced: Belgium, Cyprus, Croatia, Ireland, Romania, Serbia and Slovakia. Coverage among the unbalanced panels nevertheless remains high in many cases, although there are notable differences across countries.

The PPI dataset shows greater variation in terms of both sectoral coverage and completeness. The calendar span is similar to that of the GVA dataset. While most countries are represented by four sectors, Belgium, Cyprus, Denmark, Spain, Ireland, Italy, Serbia and Sweden are represented by three, and Luxembourg by two. The total number of country-sector observations ranges from 81 in Ireland to 376 in Austria. The PPI dataset is predominantly unbalanced, with only three countries – Belgium, Ireland and Italy – providing fully balanced sectoral panels. The degree of completeness varies considerably across the unbalanced panels: coverage ranges from 53.7% in Malta to 99.5% in Luxembourg, with several other countries also exhibiting coverage above 95%. Overall, differences in sectoral coverage, temporal availability, and within-panel missingness contribute to variation in sample size across countries. Further details of these datasets can be found in Appendix D.

4.2. Sectoral Phillips curve results

As discussed in (5), it is possible to investigate the relationship between firms' selling price expectations, driven by demand and supply factors, and producer prices within a Phillips curve framework. Table 2 presents the baseline results. Since all specifications include country-time fixed effects, the coefficients are identified from sector-specific variation within countries at a given point in time, net of country-level shocks common across sectors. Depending on the specification, we also include sector- or country-sector fixed effects to account for time-invariant heterogeneity across sectors or country-sector pairs, respectively.

Demand-driven firms' selling price expectations are robustly and statistically significantly associated with year-on-year sectoral GVA deflators. Without controlling for inflation inertia (specification I), the estimated association is 0.09 and is statistically significant at the 1% level. However, when controlling for deflator growth in the previous period (specification II), the strength of the association weakens, though it still remains statistically significant at the 1% level. Controlling for country-time and sector fixed effects reveals that a one percentage point increase in the proportion of firms with positive demand-driven selling price expectations is associated with a 0.04 percentage point increase in the growth rate of the GVA deflator in the following quarter. The lagged sectoral year-on-year deflator is also statistically significant at the 1% level: a one percentage point increase is associated with a 0.58 percentage point increase in the year-on-year GVA deflator in the subsequent quarter, indicating substantial persistence.

Including LCI wage growth in specification III does not alter the statistical significance of demand-driven selling price expectations or inflation inertia at the sectoral level, but slightly reduces the coefficient on demand-driven expectations to 0.034. The coefficient on the supply component of firms' selling price expectations becomes statistically significant at the 5% level. A one percentage point increase in the proportion of firms expecting higher selling prices and lower demand next quarter is associated with a 0.02 percentage point increase in next quarter's GVA deflator growth. The coefficient for the previous quarter's GVA deflator growth is 0.05 percentage points larger in magnitude than in specification II.

The inclusion of sector-country fixed effects (specification IV) increases both coefficients on demand- and supply-driven selling price expectations, suggesting that unobserved, time-invariant heterogeneity across sector-country pairs attenuates the baseline estimates. Controlling for this heterogeneity strengthens the estimated relationships, indicating that the associations are driven by within-sector-country variation over time. A one percentage point increase in the share of firms with positive demand-driven selling price expectations is associated with a 0.044 percentage point increase in the growth rate of the GVA deflator in the following quarter within a given sector-country over time, controlling for common country-level shocks. Similarly, a one percentage point increase in the supply-driven component of firms' selling price expectations is associated with a 0.032 percentage point increase in GVA deflator growth in the following quarter. The coefficient on the demand component of expectations is statistically significant at the 1% level, whereas the coefficient on the supply component is significant at the 5% level.

Adding an inflation surge dummy variable (specification V), or interacting it with the demand- and supply-driven components of firms' selling price expectations (specification VI), has little effect on the magnitude or statistical significance of the coefficients. The dummy variable is statistically significant at the 1% level, indicating that the year-on-year growth of the GVA deflator was, on average, 2.7 percentage points higher during the inflation surge.

Appendix C presents the results obtained using alternative demand and supply decompositions of firms' selling price expectations, where only $Q_{i,past_D}$ or $Q_{i,future_D}$ is used in equations (3) and (4). Appendix

E presents the results based on an alternative construction of GVA deflators using implicit price indices. These results are quantitatively similar to the baseline estimates.

Table 2: Firms' price expectations and year-on-year GVA deflators at the sectoral level

	I	II	III	IV	V	VI
Deflator_yoy_lag1		0.577*** (0.065)	0.628*** (0.047)	0.609*** (0.049)	0.609*** (0.049)	0.610*** (0.049)
Wage_yoy_lag1			-0.019 (0.034)	-0.020 (0.034)	-0.020 (0.034)	-0.020 (0.033)
$I_{2021Q4:2023Q3}$					2.652*** (0.360)	2.770*** (0.702)
Demand_lag1	0.086*** (0.020)	0.039*** (0.010)	0.034*** (0.009)	0.044*** (0.011)	0.044*** (0.011)	0.045*** (0.012)
Supply_lag1	0.023 (0.023)	0.016 (0.012)	0.020** (0.010)	0.032** (0.014)	0.032** (0.014)	0.034** (0.013)
Demand_lag1 $\times I_{2021Q4:2023Q3}$						-0.002 (0.029)
Supply_lag1 $\times I_{2021Q4:2023Q3}$						-0.007 (0.022)
Sector FE	YES	YES	YES			
Sector-Country FE				YES	YES	YES
Country-Time FE	YES	YES	YES	YES	YES	YES
N	10,171	10,171	9,400	9,400	9,400	9,400
Obs./country	317.84	317.84	324.14	324.14	324.14	324.14
Countries	32	32	29	29	29	29
R ²	0.586	0.725	0.783	0.786	0.786	0.786
Adj. R ²	0.433	0.624	0.703	0.703	0.703	0.703

Note: Standard errors are clustered at the country level.

The included countries are: Austria, Belgium, Bulgaria, Cyprus, Czechia, Germany, Denmark, Estonia, Greece, Spain, Finland, France, Croatia, Hungary, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, the Netherlands, Poland, Portugal, Romania, Serbia, Sweden, Slovenia, Slovakia, and Türkiye.

4.3. Robustness checks

The first robustness check involves using year-on-year growth in the number of vacancies as an alternative measure of economic slack. However, as these data are only available for 25 countries (compared to 29 previously) and there are fewer observations per country, the sample size also decreases. Table 3 presents the results. Controlling for country-time and sector fixed effects (specification I) yields a coefficient on firms' demand-driven selling price expectations that is consistent with the corresponding result in Table 2. A one percentage point increase in the share of firms with positive demand-driven selling price expectations is associated with a 0.09 percentage point increase in the growth rate of the GVA deflator in the next quarter at the sectoral level, net of country-specific macroeconomic shocks, and is statistically significant at the 1% level. However, when controlling for inflation inertia (specification II), the magnitudes of the coefficients on both the demand- and supply-driven components of firms' selling price expectations decline. The demand-driven component is now associated with a 0.039 percentage point increase in deflator growth. The coefficient on inflation inertia is also identical to the corresponding

estimate in Table 2: a one percentage point increase in the growth rate of the GVA deflator in the previous quarter is associated with a 0.58 percentage point increase in the growth rate of the GVA deflator in the current quarter.

Column III presents the specification with inflation inertia and sector and country-time fixed effects, as in specification II, while additionally controlling for the year-on-year growth rate of the number of vacancies. The sample size is smaller than that used in specifications incorporating LCI wage growth because vacancy data are generally only available from 2009 onwards, with coverage starting even later for some countries. Compared with specification II, which includes 10,171 observations, the coefficient on the demand-driven component of firms' selling price expectations is similar in magnitude and statistical significance: it is 0.035, compared with 0.039 in specification II, and remains statistically significant at the 1% level. Although the coefficient on inflation inertia has increased from 0.58 to 0.63, it remains highly statistically significant. Overall, the results of specification III are quantitatively similar to those of specification III in Table 2, which uses LCI wage growth instead of vacancy growth and is estimated using a sample containing almost twice as many observations. As with the results for the year-on-year growth rate of sectoral wages (Table 2), the growth rate of the number of vacancies, used as an alternative measure of economic slack, is not statistically significant.

Table 3: Firms' price expectations and year-on-year GVA deflators at the sectoral level with alternative economic slack

	I	II	III	IV	V	VI
Deflator_yoy_lag1		0.577*** (0.065)	0.628*** (0.059)	0.609*** (0.065)	0.609*** (0.065)	0.608*** (0.065)
Vacancies_yoy_lag1			0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
$I_{2021Q4:2023Q3}$					3.631*** (0.469)	3.500*** (0.956)
Demand_lag1	0.086*** (0.020)	0.039*** (0.010)	0.035*** (0.013)	0.042** (0.017)	0.042** (0.017)	0.041** (0.016)
Supply_lag1	0.023 (0.023)	0.016 (0.012)	0.011 (0.017)	0.031 (0.024)	0.031 (0.024)	0.027 (0.022)
Demand_lag1 $\times I_{2021Q4:2023Q3}$						0.004 (0.039)
Supply_lag1 $\times I_{2021Q4:2023Q3}$						0.010 (0.027)
Sector FE	YES	YES	YES			
Sector-Country FE				YES	YES	YES
Country-Time FE	YES	YES	YES	YES	YES	YES
N	10,171	10,171	4,723	4,723	4,723	4,723
Obs./country	317.84	317.84	188.92	188.92	188.92	188.92
Countries	32	32	25	25	25	25
R ²	0.586	0.725	0.734	0.738	0.738	0.738
Adj. R ²	0.433	0.624	0.617	0.616	0.616	0.616

Note: Standard errors are clustered at the country level.

The included countries are: Belgium, Bulgaria, Cyprus, Czechia, Germany, Denmark, Estonia, Greece, Spain, Finland, France, Croatia, Hungary, Ireland, Lithuania, Luxembourg, Latvia, Malta, the Netherlands, Poland, Portugal, Romania, Sweden, Slovenia, and Slovakia.

Columns IV-VI present the results after controlling for sector-country fixed effects. The coefficients on the demand-driven component of firms' selling price expectations are highly robust across all these specifications. An increase of one percentage point in the proportion of firms with positive demand-driven selling price expectations is associated with a 0.042 percentage point increase in the year-on-year growth rate of the GVA deflator in the subsequent quarter. This coefficient is statistically significant at the 1% level. Inflation persistence is also robust and statistically significant across these specifications. An increase of one percentage point in the year-on-year growth rate of the GVA deflator in the previous quarter is associated with an increase of 0.61 percentage points in the current quarter, which is almost identical to the corresponding result reported in [Table 2](#). The inflation surge dummy (specifications V-VI) is positive and statistically significant, indicating that the sectoral GVA deflator growth rate was, on average, 3.5–3.6 percentage points higher during the inflation surge. However, the interactions of the inflation surge dummy with the demand- and supply-driven components of firms' selling price expectations are not statistically significant (specification VI). The coefficient on demand-driven selling price expectations is also slightly lower in magnitude, by approximately 0.001.

The final robustness check uses producer prices for different sectors as an alternative measure of sectoral inflation, rather than GVA deflators. However, the sample is more imbalanced, as these producer prices are obtained from various sources and there are many missing observations for some countries (see [Appendix D](#)). [Table 4](#) presents the results. The results for demand-driven selling price expectations are robust and quantitatively similar to those reported in [Table 2](#) and [Table 3](#). The first specification (I) presents the results obtained by excluding inflation inertia and economic slack, while controlling only for sector and country-time fixed effects. In this specification, both the demand- and supply-driven components of firms' selling price expectations are statistically significant at the 1% level. Furthermore, the coefficients on the two components are similar in magnitude. A one percentage point increase in the share of firms expecting higher prices and lower demand is associated with a 0.101 percentage point increase in the year-on-year growth rate of the sectoral PPI in the subsequent quarter. In comparison, a one percentage point increase in the proportion of firms anticipating higher prices and demand is associated with a 0.104 percentage point increase in the year-on-year growth rate of the sectoral PPI in the following quarter.

However, the results change when controlling for inflation persistence (specification II). The coefficient on lagged PPI inflation is highly statistically significant and larger in magnitude than when the GVA deflator is used. A one percentage point increase in the PPI growth rate in the previous quarter is associated with a 0.86 percentage point increase in the PPI growth rate in the current quarter. In this specification, the coefficient on the demand-driven component of firms' selling price expectations is smaller in magnitude than in specification I, but remains statistically significant at the 1% level. An increase of one percentage point in the proportion of firms anticipating higher prices and demand is associated with a 0.028 percentage point increase in PPI growth in the subsequent quarter. Similarly, a one percentage point increase in the proportion of firms anticipating higher prices and lower demand is linked to a 0.022 percentage point increase in PPI growth in the subsequent quarter. The coefficient on the supply-driven component of firms' selling price expectations is also statistically significant at the 1% level.

When sector-country fixed effects are included (specification III), the magnitude of the coefficients on the demand- and supply-driven components of firms' selling price expectations increases relative to the specification that controls only for sectoral fixed effects (specification II). Specifically, a one percentage point increase in the demand-driven component of firms' selling price expectations is associated with a 0.038 percentage point increase in PPI inflation in the following quarter. By contrast, a one percentage

point increase in the supply-driven component is associated with a 0.031 percentage point increase in PPI inflation in the subsequent quarter.

These results remain robust when LCI wage growth is included in the regression (specifications IV–VI). The results for the demand-driven component of firms' selling price expectations are robust across these specifications and economically similar to those reported in Table 2 and Table 3: on average, a one percentage point increase in the proportion of firms anticipating higher demand and prices is associated with a 0.03–0.04 percentage point increase in PPI growth in the subsequent quarter. However, the supply-driven component of firms' selling price expectations is statistically significant at the 5% level in specifications IV and V and at the 10% level in specification VI. The magnitude of the association with PPI growth in the subsequent quarter is approximately 0.02–0.03 percentage points.

Table 4: Firms' price expectations and year-on-year PPIs at the sectoral level

	I	II	III	IV	V	VI
PPI_yoy_lag1		0.844*** (0.020)	0.836*** (0.023)	0.858*** (0.015)	0.852*** (0.016)	0.851*** (0.017)
Wage_yoy_lag1				-0.035* (0.020)	-0.038* (0.021)	-0.036* (0.022)
$I_{2021Q4:2023Q3}$					0.380 (0.265)	-0.745 (0.632)
Demand_lag1	0.104*** (0.018)	0.028*** (0.005)	0.038*** (0.008)	0.030*** (0.005)	0.040*** (0.007)	0.034*** (0.007)
Supply_lag1	0.101*** (0.030)	0.022*** (0.008)	0.031*** (0.012)	0.020** (0.008)	0.028** (0.011)	0.019* (0.011)
Demand_lag1 $\times I_{2021Q4:2023Q3}$						0.054** (0.027)
Supply_lag1 $\times I_{2021Q4:2023Q3}$						0.019 (0.025)
Sector FE	YES	YES		YES		
Sector-Country FE			YES		YES	YES
Country-Time FE	YES	YES	YES	YES	YES	YES
N	8,776	8,776	8,776	8,134	8,134	8,134
Obs./country	265.94	265.94	265.94	280.48	280.48	280.48
Countries	33	33	33	29	29	29
R ²	0.727	0.924	0.924	0.932	0.932	0.932
Adj. R ²	0.598	0.888	0.887	0.901	0.900	0.900

Note: Standard errors are clustered at the country level.

The included countries are: Austria, Belgium, Bulgaria, Cyprus, Czechia, Germany, Denmark, Estonia, Greece, Spain, Finland, France, Croatia, Hungary, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, the Netherlands, Poland, Portugal, Romania, Serbia, Sweden, Slovenia, Slovakia, and Türkiye.

In the last two specifications, the inflation surge dummy variable is not statistically significant. This suggests that the increase in PPI inflation during the inflation surge can be explained by inflation persistence, as well as by the demand- and supply-driven components of firms' selling price expectations. The coefficient on the demand-driven component of firms' selling price expectations remains statistically significant at the 1% level across all specifications. Furthermore, the interaction between the demand-driven component and the inflation surge dummy variable is positive and statistically significant. This

indicates that, during the inflation surge, the positive correlation between demand-driven selling price expectations and PPI inflation in the subsequent quarter was stronger than in other periods. Interestingly, LCI wage growth is negatively associated with PPI inflation in the following quarter in specifications IV-VI, although the coefficients are only statistically significant at the 10% level. A one percentage point increase in LCI wage growth is associated with a 0.035 percentage point decrease in PPI inflation in the following quarter.

5. Propagation of macroeconomic shocks across sectors

From a monetary policy perspective, it is important to understand the impact of euro-area monetary policy on firms' selling price expectations. As these expectations are associated with producer inflation, examining this relationship can help evaluate the effectiveness of the central bank in controlling inflation. However, the transmission of monetary policy shocks may vary across sectors of the economy. To account for this heterogeneity, we examine how monetary policy shocks affect the demand and supply components of selling price expectations across different sectors. As monetary policy shocks can be considered negative demand shocks, a useful robustness check is to compare their effects with those of positive demand shocks. For Slovakia, changes in global demand are particularly relevant for comparison, given the country's high degree of trade openness and the strong export orientation of its industrial sector. The impact of global demand shocks on firms' selling price expectations is also likely to differ across sectors depending on their exposure to foreign markets and their position in the production chain. The analysis therefore compares the sectoral transmission of two opposing demand shocks: an expansionary global economic activity shock and a contractionary euro-area monetary policy shock. Specifically, it examines how these shocks impact the demand and supply components of firms' selling price expectations, and whether these effects differ between sectors, as well as between Slovakia and the euro area.

As exogenous shocks, we use the following series: economic activity shocks until 2025:M9 from [Baumeister and Hamilton \(2019\)](#) and monetary policy shocks until 2025:M10 from [Altavilla et al. \(2019\)](#). We use the following economic indicators in a structural vector autoregression (SVAR) model: industrial production in Slovakia/the euro area, the harmonised index of consumer prices (HICP) in Slovakia/the euro area from [Národná banka Slovenska \(NBS\) \(2026\)](#) and [Eurostat \(2026\)](#).

All variables have a monthly frequency. Industrial production and the HICP were transformed using the formula $100 \cdot \ln(\text{variable})$. The model was estimated using Bayesian methods with a Normal-inverse-Wishart prior, and the hyperparameter associated with the first lag of the variables was set to one. All other hyperparameters are standard, as detailed in the literature. We use the Cholesky identification scheme. The variables are ordered as follows: one of the shock series (economic activity or monetary policy shocks); a demand or supply component of firms' price expectations in a given sector; industrial production; and the HICP. Since the frequency is monthly, we use twelve lags of the variables. We ran 10,000 iterations after 5,000 burn-in iterations. The model was estimated using the BEAR toolbox ([Alistair and van R. Björn, 2016](#)).

Figure 6 presents the effects of exogenous demand shocks on the demand and supply components of firms' selling price expectations in Slovakia and the euro area. Columns (a) and (b) present the effects of global economic activity shocks on firms' price expectations in Slovakia and the euro area

across different sectors. Columns (c) and (d) present the effects of monetary policy shocks on the corresponding variables in Slovakia and the euro area. The first row shows the effect of shocks on the demand component of firms' selling price expectations in various sectors in Slovakia and the euro area. The second row presents the effect on the supply component of firms' price expectations. The final row discusses the overall effect on firms' selling price expectations in Slovakia and the euro area across sectors.

The first column in the first row (panel (a)) shows the effect of economic activity shocks on firms' selling price expectations in Slovakia. A positive shock to global economic activity affects the demand component of firms' selling price expectations, together with industrial production and HICP, and leads to an increase in demand-driven price expectations across all sectors. The impact of this shock is strongest for firms in the industrial sector. Given the high export dependence of Slovakia's industrial sector, global demand shocks exert the most pronounced positive effect in this case. Selling price expectations of industrial firms increase by around 2 percentage points on impact, with the effect gradually declining over the subsequent 10 months. The effect of global economic activity shocks on selling price expectations in the construction, retail trade, and services sectors is also positive, with an initial increase of approximately 1–1.5 percentage points, followed by a gradual decline. This effect is more persistent in the construction and retail trade sectors.

The second column in the first row (panel (b)) shows the impact of the same shock on the euro area. The demand component of firms' selling price expectations in the industrial, retail, and services sectors increases by about 0.1 percentage points on impact, with the effect gradually declining over time. In the construction sector, however, the response builds up more slowly, reaching an increase of around 0.1 percentage points.

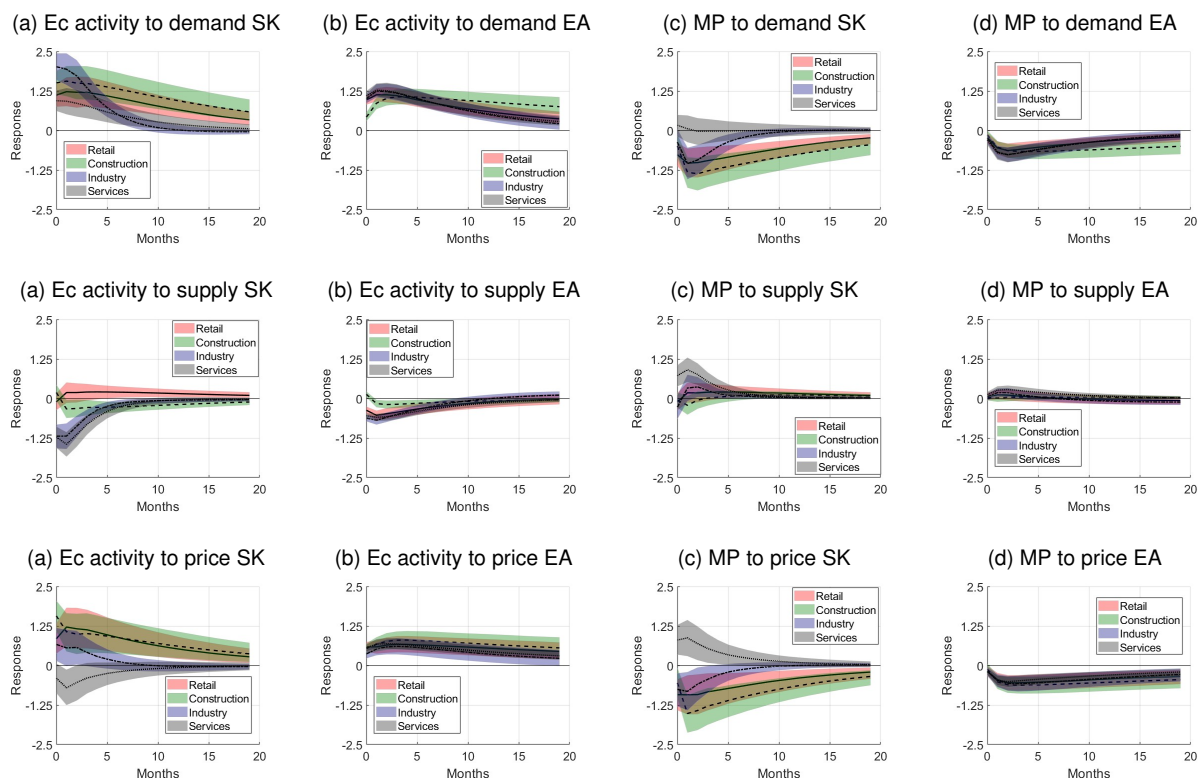
The first two columns in the second row (panels (a) and (b)) present the effects of positive global economic activity shocks on the supply component of firms' selling price expectations in Slovakia and the euro area. In Slovakia (panel (a)), a positive global economic activity shock leads to a decline on impact in the supply component of selling price expectations in the industrial and services sectors of about 1.25 percentage points, followed by a gradual attenuation of the effect over time. The responses of supply-side selling price expectations in the construction and retail trade sectors differ. In the construction sector, supply-side expectations decline by around 0.2–0.3 percentage points a few months after the shock, with the effect persisting for approximately 15 months. In contrast, in the retail trade sector, supply-side selling price expectations increase slightly – by about 0.2–0.3 percentage points within roughly four months – and this effect is relatively persistent.

In the euro area, the effect of a positive global economic activity shock on supply-side selling price expectations (second row, column (b)) is more homogeneous across sectors. The shock leads to a decline of around 0.5–0.6 percentage points in the supply component of firms' selling price expectations in the retail, industrial, and services sectors, with the effect persisting for approximately 10 months before gradually dissipating. In the construction sector, the decline is more moderate – around 0.1–0.2 percentage points – and is likewise followed by a gradual attenuation over time.

Panels (a) and (b) in the third row present the overall effect of a positive global economic activity shock on firms' selling price expectations, which is the sum of the demand and supply components. In Slovakia, the shock generally leads to an increase in firms' selling price expectations in retail trade, construction, and industry. The positive impact on firms' price expectations is highest in retail trade and construction, at around 1.5 and 1 percentage points, respectively, and declines slowly afterwards, remaining positive for around 20 months after the shock. The positive effect of the shock on firms' selling price

expectations in the industrial sector is somewhat lower in magnitude: the shock increases firms' selling price expectations in the industrial sector by around 0.7 percentage points, but the effect declines more sharply and becomes negligible within seven months of the shock. This is because the shock increases demand-side selling price expectations in industry (first row, column (a)), but also leads to the strongest decline in supply-side selling price expectations (second row, column (a)). Therefore, the overall effect is positive, but smaller than that in the retail trade and construction sectors.

Figure 6: The effects of macroeconomic shocks on demand- and supply-side price expectations



Notes: pink, green, grey and blue areas represent 68% credible sets.

Surprisingly, the overall effect of a positive global economic activity shock on selling price expectations in the Slovak services sector is negative (third row, column (a)), declining by around 1 percentage point a few months after the shock, with the effect lasting for around five months. Nevertheless, this negative effect stems from the negative impact on the supply-side component of firms' selling price expectations, meaning that positive global economic activity shocks reduce the proportion of service firms that expect higher selling prices alongside lower demand, while increasing the proportion that expect higher selling prices alongside higher demand, with the reduction in the supply-side component being larger in magnitude.

The effect of a positive global economic activity shock on the selling price expectations of firms in the euro area (column (b) in the third row) is positive and homogeneous across sectors: it leads to an increase of about 0.4–0.6 percentage points in firms' selling price expectations across sectors, and the effect is quite long-lasting.

The final two columns discuss the impact of a contractionary monetary policy shock on the demand component of firms' selling price expectations in different sectors in Slovakia (column (c)) and the euro

area (column (d)). A one standard deviation contractionary monetary policy shock leads to a decline in firms' demand-driven selling price expectations in retail trade, industry, and construction of about 0.5–1 percentage points on impact. This effect is shortest-lived in industry, reaching a maximum decline of 1 percentage point a few months after the shock, and dissipates after about 10 months. The effect is more pronounced in retail trade and construction, which also reach a maximum decline of 1 and 1.3 percentage points a few months after the shock, respectively. However, the effect dissipates more slowly than in the case of industry, with a negative effect still evident 20 months after the shock. Interestingly, a contractionary monetary policy shock does not affect demand-driven selling price expectations for services in Slovakia.

The effect of a contractionary monetary policy shock on firms' demand-driven price expectations is quite homogeneous across the different sectors of the euro area economy (column (d), first row). It has an initial negative impact of around -0.2 percentage points, reaching a maximum negative impact of around -0.8 to -0.9 percentage points. The effect then gradually diminishes, remaining negative for around 20 months after the shock. There is a slightly more negative long-run effect on demand-driven selling price expectations in the construction sector.

Columns (c) and (d) in the second row analyse the effect of contractionary monetary policy shocks on the supply component of selling price expectations in different sectors in Slovakia (column (c)) and the euro area (column (d)). A one standard deviation contractionary monetary policy shock leads to an increase in firms' supply-side selling price expectations in services, raising them by about 0.7 percentage points on impact. This increase reflects a higher proportion of services sector firms expecting lower demand and higher costs. The effect fades after about five months. However, the shock has no significant effect on the supply-side selling price expectations of firms in other sectors in Slovakia or in the euro area (column (d)).

Columns (c) and (d) of the third row examine the effect of contractionary monetary policy shocks on firms' overall selling price expectations in different sectors in Slovakia and the euro area, taking into account the effects on the demand- and supply-side components of these expectations. Selling price expectations are the sum of these two components. A contractionary monetary policy shock leads to a rise in selling price expectations among service firms in Slovakia, and the effect is slightly higher in magnitude and more prolonged than the effect on the supply-side component alone. The shock leads to an increase in selling price expectations among service firms by about 0.8 percentage points on impact, slowly fading after about 10 months. This counterintuitive result for services can be explained by supply-side selling price expectations, since a contractionary monetary policy shock increases the proportion of firms expecting lower demand, but these firms also anticipate higher selling prices.

A contractionary monetary policy shock has a negative effect on firms' selling price expectations in the industrial, retail, and construction sectors, with an on-impact decline of about 0.5–1 percentage points. However, the effect is shorter-lived for the industrial sector, lasting about 10 months, while it is more prolonged for the retail and construction sectors, lasting more than 20 months (see the last row of column (c)). The effects of contractionary monetary policy shocks operate mainly through demand-side selling price expectations in these sectors (first row, column (c)).

The effect of monetary policy shocks on firms' selling price expectations in the euro area (column (d), last row) is quite homogeneous. It leads to a decline of about 0.1 percentage points in those expectations on impact, reaching a maximum negative effect of 0.5–0.6 percentage points within a few months of the shock. This negative effect gradually disappears over a period of more than 20 months. This homogeneous effect is mainly due to the demand-side component of selling price expectations in the

euro area (column (d), first row).

Consistent with our findings, Kang et al. (2026) found, using a decomposition of personal consumption expenditure into demand- and supply-driven components, that a monetary policy shock propagates primarily through the demand component of inflation.

6. Conclusions

This study develops a novel approach to decomposing firms' selling price expectations into demand- and supply-driven components by combining information on past realised demand, expectations regarding future demand, and expected changes in selling prices. Aggregating the resulting sectoral indicators using the respective sector weights allows us to construct economy-wide, real-time measures of the demand- and supply-driven components of firms' selling price expectations.

The Cholesky-identified VAR results suggest that the decomposed demand and supply components of firms' selling price expectations can be interpreted as demand and supply shocks when ordered first. Furthermore, exogenous demand shocks, such as those driven by global economic conditions and monetary policy, primarily affect firms' selling price expectations through the demand-driven component, with comparatively limited effects operating through the supply-driven component. This finding provides evidence that the decomposition captures economically meaningful differences in the channels through which shocks affect firms' selling price expectations.

Overall, the findings suggest the existence of a Phillips curve-type relationship, whereby firms' selling price expectations, particularly those driven by demand, play a significant role in explaining producer price dynamics. The results also indicate strong inflation persistence and show that the relationship between expectations and prices remains stable even during periods of elevated inflation. Taken together, these findings suggest that firms' expectations may play a role in the transmission of demand shocks to prices and may therefore be relevant for assessing inflationary trends.

The current methodology enables policymakers to monitor demand and supply pressures across sectors in real time. This allows them to assess whether firms' selling price expectations are driven by demand or supply factors, identify the sectors most affected by these pressures, and design targeted policy measures accordingly. The resulting demand and supply indices have the desirable property of not being revised over time and are available monthly at the sectoral level.

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Appendices

A. Equivalence of Firm-Level Weighted and Balance Shares

Notation: For each firm i :

- w_i : weight
- $P_i \in \{1, 0, -1\}$: firm's response regarding expected prices
- $Q_i \in \{1, 0, -1\}$: firm's response concerning past and expected demand, business activity, or production trends

Define the firm-level composite variable:

$$Z_i = P_i - Q_i$$

The weighted average of Z_i is:

$$I = \frac{\sum_i w_i Z_i}{\sum_i w_i} = \frac{\sum_i w_i (P_i - Q_i)}{\sum_i w_i}.$$

Step 1: Decompose P_i using indicator functions

Since $P_i \in \{1, 0, -1\}$, we can write

$$P_i = \mathbf{1}(P_i = 1) - \mathbf{1}(P_i = -1),$$

where $\mathbf{1}(\cdot)$ is the indicator function.

Multiplying by the weight and summing over i :

$$\sum_i w_i P_i = \sum_i w_i \mathbf{1}(P_i = 1) - \sum_i w_i \mathbf{1}(P_i = -1).$$

Similarly for Q_i :

$$\sum_i w_i Q_i = \sum_i w_i \mathbf{1}(Q_i = 1) - \sum_i w_i \mathbf{1}(Q_i = -1).$$

Step 2: Define weighted shares of positive and negative responses

Let

$$s_{P,+} = \frac{\sum_i w_i \mathbf{1}(P_i = 1)}{\sum_i w_i}, \quad s_{P,-} = \frac{\sum_i w_i \mathbf{1}(P_i = -1)}{\sum_i w_i},$$
$$s_{Q,+} = \frac{\sum_i w_i \mathbf{1}(Q_i = 1)}{\sum_i w_i}, \quad s_{Q,-} = \frac{\sum_i w_i \mathbf{1}(Q_i = -1)}{\sum_i w_i}.$$

Step 3: Rewrite I in terms of balance shares

Using the definitions above:

$$\frac{\sum_i w_i P_i}{\sum_i w_i} = s_{P,+} - s_{P,-}, \quad \frac{\sum_i w_i Q_i}{\sum_i w_i} = s_{Q,+} - s_{Q,-}.$$

Hence, the firm-level weighted difference can be written as

$$I = \frac{\sum_i w_i (P_i - Q_i)}{\sum_i w_i} = \frac{\sum_i w_i P_i}{\sum_i w_i} - \frac{\sum_i w_i Q_i}{\sum_i w_i} = (s_{P,+} - s_{P,-}) - (s_{Q,+} - s_{Q,-}).$$

Applying weights to (1) and (2) and taking the weighted average across observations yields:

$$\begin{aligned} \text{Demand} &= \frac{\sum_i w_i \frac{1}{2} \left(P_i + \frac{Q_{i,\text{past_D}} + Q_{i,\text{future_D}}}{2} \right)}{\sum_i w_i} = \frac{1}{2} \left(\underbrace{\frac{\sum_i w_i P_i}{\sum_i w_i}}_{\text{weighted average of } P_i} + \underbrace{\frac{\sum_i w_i Q_{i,\text{past_D}}}{2 \sum_i w_i}}_{\text{weighted past signal}} + \underbrace{\frac{\sum_i w_i Q_{i,\text{future_D}}}{2 \sum_i w_i}}_{\text{weighted future signal}} \right), \\ \text{Supply} &= \frac{\sum_i w_i \frac{1}{2} \left(P_i - \frac{Q_{i,\text{past_D}} + Q_{i,\text{future_D}}}{2} \right)}{\sum_i w_i} = \frac{1}{2} \left(\underbrace{\frac{\sum_i w_i P_i}{\sum_i w_i}}_{\text{weighted average of } P_i} - \underbrace{\frac{\sum_i w_i Q_{i,\text{past_D}}}{2 \sum_i w_i}}_{\text{weighted past signal}} - \underbrace{\frac{\sum_i w_i Q_{i,\text{future_D}}}{2 \sum_i w_i}}_{\text{weighted future signal}} \right). \end{aligned}$$

Taking the above into account, apply it to the euro area. Let each country c have firms i with firm-level weights $w_{i,c}$ and country-level weights W_c . Then, an indicator for the euro area can be expressed as:

$$I^{EA} = \frac{\sum_c W_c \sum_i w_{i,c} (P_{i,c} - Q_{i,c})}{\sum_c W_c \sum_i w_{i,c}}$$

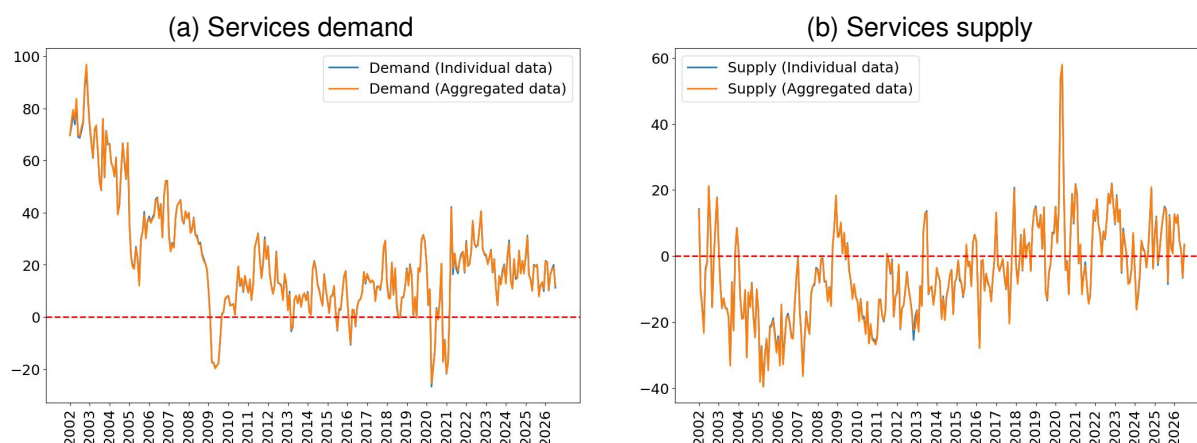
Alternatively:

$$I^{EA} = (P_+^{EA} - P_-^{EA}) - (Q_+^{EA} - Q_-^{EA})$$

Even if countries use different weighting schemes, as long as each country applies its own scheme consistently across questions and aggregation steps, an indicator computed from aggregated shares will be exactly equal to the indicator computed from firm-level differences and then aggregated. Provided that, within each country, partner institutions use the same weights for P and Q (or proportional weights), the same grouping structure (branches, size classes, etc.), the same group-level weights, the same normalisation within each group and the same treatment of non-response, then the results will be the same. Therefore, provided the same weighting hierarchy is used, computing an indicator from firm-level differences or from aggregated balance shares yields identical results. Any discrepancy between the two approaches would only arise if the weighting scheme or aggregation order differed.

B. Comparison of demand/supply pressures for Slovakia

Figure B.1: Comparison of supply pressures using formulas for individual and aggregated answers for Slovakia

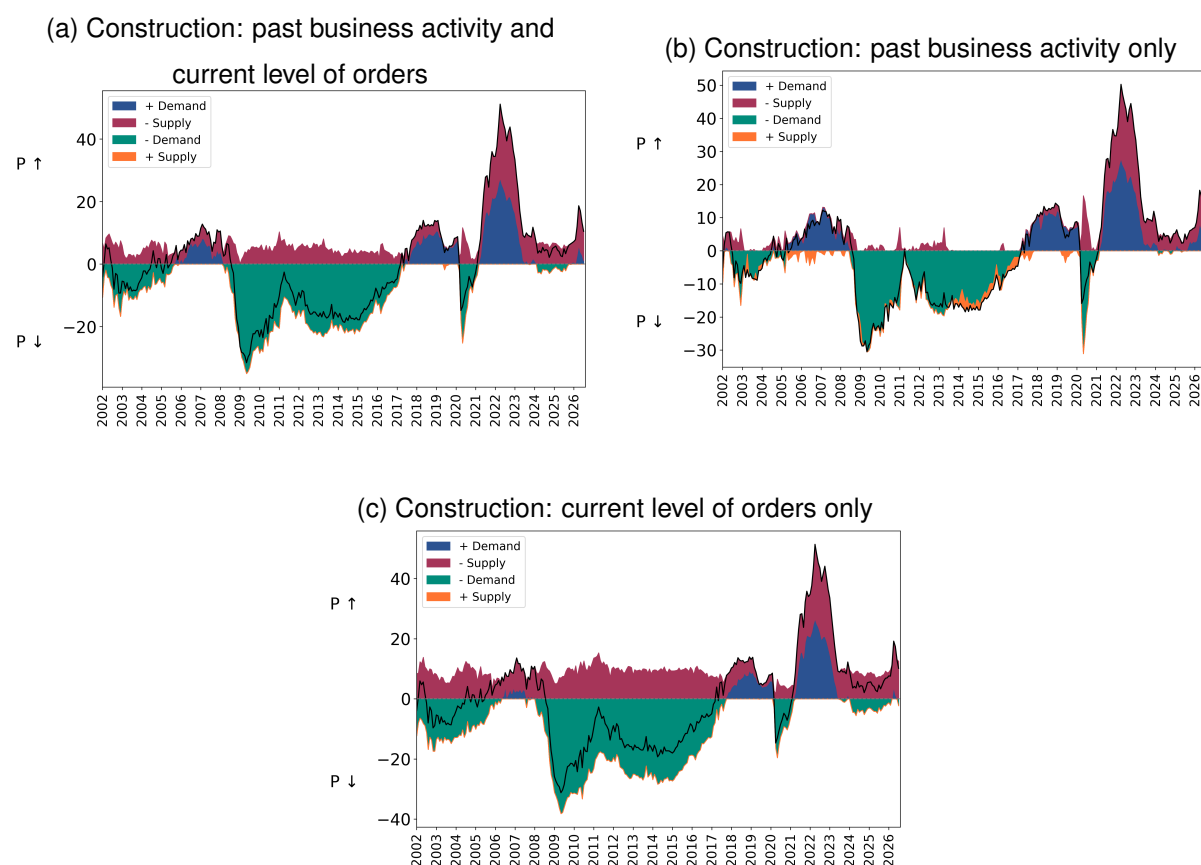


Notes: Blue – using micro data; orange – using aggregate shares.

Source: Statistical Office of the Slovak Republic (SU SR) (2026) and author's calculations.

C. Comparison of decompositions for the EA, using either past or future demand

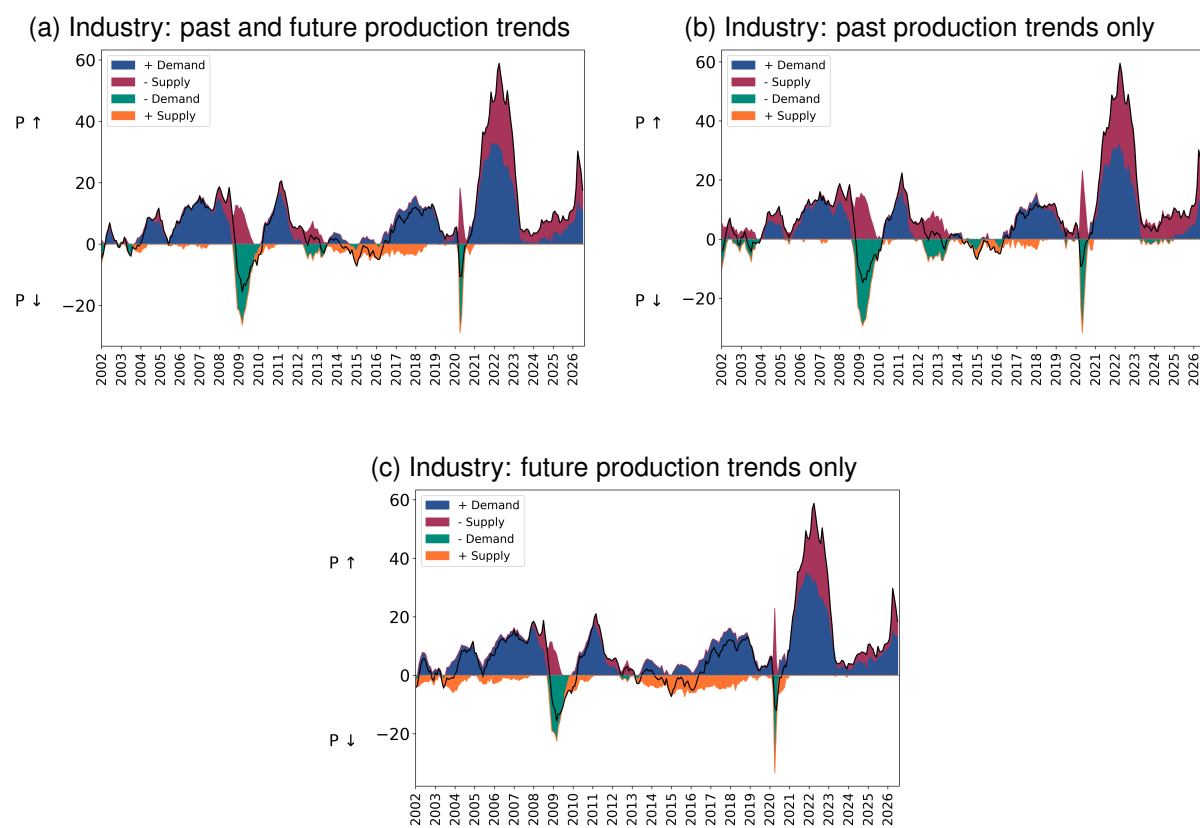
Figure C.1: Demand and supply components of firms' selling price expectations in construction



Notes: Seasonally adjusted.

Source: European Commission (2026a) and author's calculations.

Figure C.2: Demand and supply components of firms' selling price expectations in industry

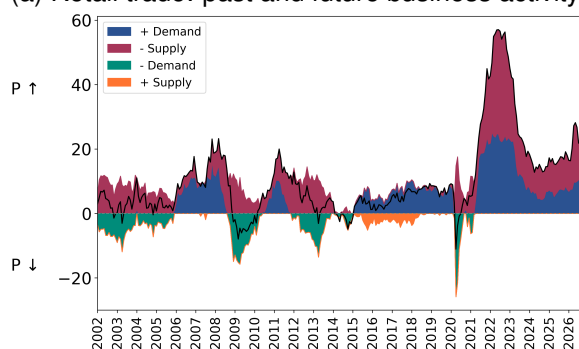


Notes: Seasonally adjusted.

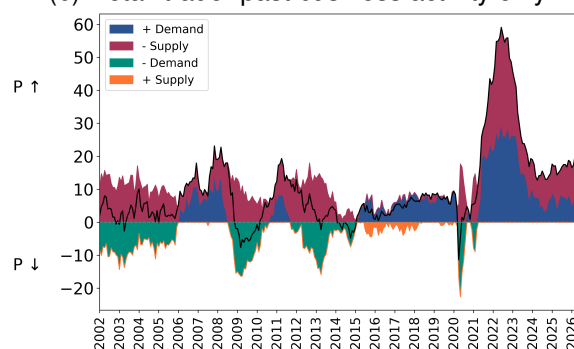
Source: European Commission (2026a) and author's calculations.

Figure C.3: Demand and supply components of firms' selling price expectations in retail trade

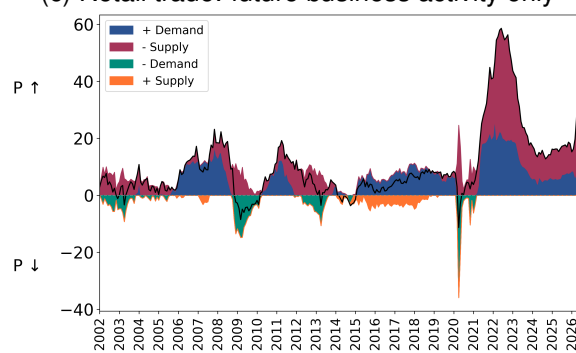
(a) Retail trade: past and future business activity



(b) Retail trade: past business activity only



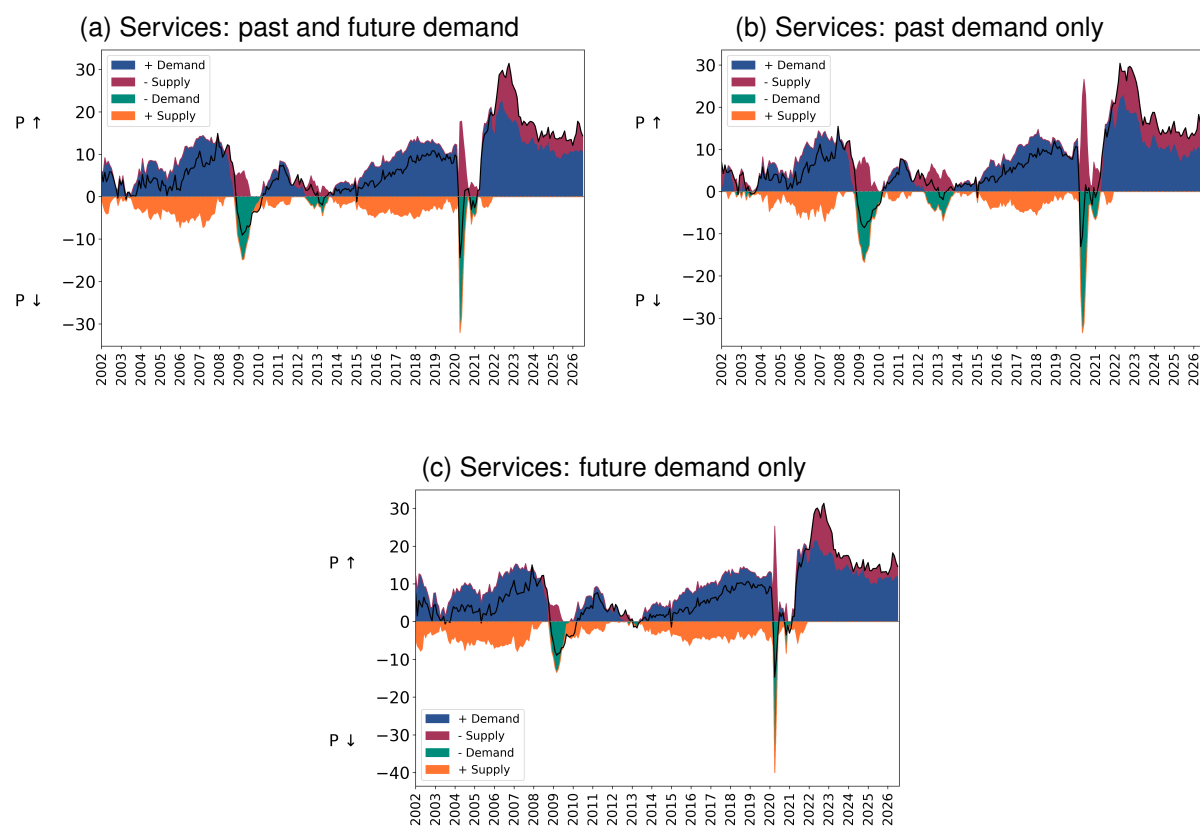
(c) Retail trade: future business activity only



Notes: Seasonally adjusted.

Source: European Commission (2026a) and author's calculations.

Figure C.4: Demand and supply components of firms' selling price expectations in services



Notes: Seasonally adjusted.

Source: European Commission (2026a) and author's calculations.

Table C.1: Firms' price expectations and y-o-y GVA deflators at the sectoral level using only past demand (business activity or production trends) answers in decompositions

	I	II	III	IV	V	VI	VII
Deflator_yoy_lag1		0.579*** (0.065)	0.558*** (0.069)	0.629*** (0.047)	0.610*** (0.049)	0.610*** (0.049)	0.610*** (0.049)
Wage_yoy_lag1				-0.018 (0.033)	-0.019 (0.033)	-0.019 (0.033)	-0.020 (0.033)
$I_{2021Q4:2023Q3}$						2.645*** (0.360)	2.776*** (0.658)
Demand_lag1	0.073*** (0.019)	0.036*** (0.009)	0.052*** (0.013)	0.032*** (0.008)	0.043*** (0.011)	0.043*** (0.011)	0.044*** (0.011)
Supply_lag1	0.044* (0.022)	0.019 (0.012)	0.031** (0.014)	0.024** (0.011)	0.033** (0.014)	0.033** (0.014)	0.037*** (0.013)
$Demand_lag1 \times I_{2021Q4:2023Q3}$							0.002 (0.024)
$Supply_lag1 \times I_{2021Q4:2023Q3}$							-0.016 (0.023)
Sector FE	YES	YES		YES			
Sector-Country FE			YES		YES	YES	YES
Country-Time FE	YES	YES	YES	YES	YES	YES	YES
N	10,171	10,171	10,171	9,400	9,400	9,400	9,400
Obs./country	317.84	317.84	317.84	324.14	324.14	324.14	324.14
Countries	32	32	32	29	29	29	29
R ²	0.584	0.725	0.729	0.783	0.786	0.786	0.786
Adj. R ²	0.431	0.623	0.624	0.703	0.703	0.703	0.703

Note: Standard errors are clustered at the country level.

The included countries are: Austria, Belgium, Bulgaria, Cyprus, Czechia, Germany, Denmark, Estonia, Greece, Spain, Finland, France, Croatia, Hungary, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, the Netherlands, Poland, Portugal, Romania, Serbia, Sweden, Slovenia, Slovakia, and Türkiye.

Table C.2: Firms' price expectations and y-o-y GVA deflators at the sectoral level using only future demand (business activity, production trends or current level of orders) answers in decompositions

	I	II	III	IV	V	VI	VII
Deflator_yoy_lag1		0.577*** (0.065)	0.557*** (0.068)	0.627*** (0.048)	0.609*** (0.049)	0.609*** (0.049)	0.609*** (0.049)
Wage_yoy_lag1				-0.020 (0.034)	-0.021 (0.034)	-0.021 (0.034)	-0.021 (0.034)
$I_{2021Q4:2023Q3}$						2.775*** (0.364)	2.951*** (0.695)
Demand_lag1	0.084*** (0.019)	0.037*** (0.010)	0.047*** (0.012)	0.034*** (0.009)	0.043*** (0.011)	0.043*** (0.011)	0.044*** (0.012)
Supply_lag1	0.027 (0.020)	0.020** (0.010)	0.041*** (0.015)	0.021** (0.009)	0.034*** (0.012)	0.034*** (0.012)	0.035*** (0.013)
Demand_lag1 $\times I_{2021Q4:2023Q3}$							-0.007 (0.029)
Supply_lag1 $\times I_{2021Q4:2023Q3}$							-0.004 (0.018)
Sector FE	YES	YES		YES			
Sector-Country FE			YES		YES	YES	YES
Country-Time FE	YES	YES	YES	YES	YES	YES	YES
N	10,196	10,196	10,196	9,425	9,425	9,425	9,425
Obs./country	318.62	318.62	318.62	325.00	325.00	325.00	325.00
Countries	32	32	32	29	29	29	29
R ²	0.590	0.727	0.731	0.785	0.787	0.787	0.787
Adj. R ²	0.439	0.626	0.627	0.706	0.706	0.706	0.706

Note: Standard errors are clustered at the country level.

The included countries are: Austria, Belgium, Bulgaria, Cyprus, Czechia, Germany, Denmark, Estonia, Greece, Spain, Finland, France, Croatia, Hungary, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, the Netherlands, Poland, Portugal, Romania, Serbia, Sweden, Slovenia, Slovakia, and Türkiye.

D. Data description

D.1. Country-specific coverage of the GVA dataset

The main characteristics of each country's subsample are summarised below:

- Austria (AT): 2002Q2–2026Q2; 378 observations; 4 sectors; 97 quarters (24.25 years); 10 missing observations; 97.4% coverage; unbalanced panel.
- Belgium (BE): 2002Q2–2025Q3; 376 observations; 4 sectors; 94 quarters (23.50 years); no missing observations; 100.0% coverage; balanced panel.
- Bulgaria (BG): 2002Q2–2026Q2; 378 observations; 4 sectors; 97 quarters (24.25 years); 10 missing observations; 97.4% coverage; unbalanced panel.

- Cyprus (CY): 2008Q3–2026Q2; 288 observations; 4 sectors; 72 quarters (18.00 years); no missing observations; 100.0% coverage; balanced panel.
- Czechia (CZ): 2002Q2–2026Q2; 387 observations; 4 sectors; 97 quarters (24.25 years); 1 missing observation; 99.7% coverage; unbalanced panel.
- Germany (DE): 2002Q2–2026Q2; 376 observations; 4 sectors; 97 quarters (24.25 years); 12 missing observations; 96.9% coverage; unbalanced panel.
- Denmark (DK): 2002Q2–2026Q2; 310 observations; 4 sectors; 97 quarters (24.25 years); 78 missing observations; 79.9% coverage; unbalanced panel.
- Estonia (EE): 2002Q2–2026Q2; 377 observations; 4 sectors; 97 quarters (24.25 years); 11 missing observations; 97.2% coverage; unbalanced panel.
- Greece (EL): 2002Q2–2026Q2; 383 observations; 4 sectors; 97 quarters (24.25 years); 5 missing observations; 98.7% coverage; unbalanced panel.
- Spain (ES): 2002Q2–2026Q2; 324 observations; 4 sectors; 97 quarters (24.25 years); 64 missing observations; 83.5% coverage; unbalanced panel.
- Finland (FI): 2002Q2–2026Q2; 368 observations; 4 sectors; 97 quarters (24.25 years); 20 missing observations; 94.8% coverage; unbalanced panel.
- France (FR): 2002Q2–2026Q2; 362 observations; 4 sectors; 97 quarters (24.25 years); 26 missing observations; 93.3% coverage; unbalanced panel.
- Croatia (HR): 2009Q2–2026Q2; 276 observations; 4 sectors; 69 quarters (17.25 years); no missing observations; 100.0% coverage; balanced panel.
- Hungary (HU): 2002Q2–2026Q2; 351 observations; 4 sectors; 97 quarters (24.25 years); 37 missing observations; 90.5% coverage; unbalanced panel.
- Ireland (IE): 2016Q3–2023Q1; 108 observations; 4 sectors; 27 quarters (6.75 years); no missing observations; 100.0% coverage; balanced panel.
- Italy (IT): 2002Q2–2020Q1; 281 observations; 4 sectors; 72 quarters (18.00 years); 7 missing observations; 97.6% coverage; unbalanced panel.
- Lithuania (LT): 2005Q2–2026Q2; 297 observations; 4 sectors; 85 quarters (21.25 years); 43 missing observations; 87.4% coverage; unbalanced panel.
- Luxembourg (LU): 2002Q2–2026Q1; 191 observations; 2 sectors; 96 quarters (24.00 years); 1 missing observation; 99.5% coverage; unbalanced panel.
- Latvia (LV): 2002Q2–2026Q2; 368 observations; 4 sectors; 97 quarters (24.25 years); 20 missing observations; 94.8% coverage; unbalanced panel.
- Malta (MT): 2004Q3–2026Q2; 192 observations; 4 sectors; 88 quarters (22.00 years); 160 missing observations; 54.5% coverage; unbalanced panel.
- Netherlands (NL): 2002Q2–2026Q1; 339 observations; 4 sectors; 96 quarters (24.00 years); 45 missing observations; 88.3% coverage; unbalanced panel.

- Poland (PL): 2002Q2–2026Q2; 364 observations; 4 sectors; 97 quarters (24.25 years); 24 missing observations; 93.8% coverage; unbalanced panel.
- Portugal (PT): 2002Q2–2026Q2; 379 observations; 4 sectors; 97 quarters (24.25 years); 9 missing observations; 97.7% coverage; unbalanced panel.
- Romania (RO): 2005Q2–2026Q2; 340 observations; 4 sectors; 85 quarters (21.25 years); no missing observations; 100.0% coverage; balanced panel.
- Serbia (RS): 2013Q3–2026Q2; 208 observations; 4 sectors; 52 quarters (13.00 years); no missing observations; 100.0% coverage; balanced panel.
- Sweden (SE): 2002Q2–2026Q2; 378 observations; 4 sectors; 97 quarters (24.25 years); 10 missing observations; 97.4% coverage; unbalanced panel.
- Slovenia (SI): 2002Q2–2026Q2; 384 observations; 4 sectors; 97 quarters (24.25 years); 4 missing observations; 99.0% coverage; unbalanced panel.
- Slovakia (SK): 2002Q2–2026Q2; 388 observations; 4 sectors; 97 quarters (24.25 years); no missing observations; 100.0% coverage; balanced panel.
- Türkiye (TR): 2008Q2–2026Q1; 249 observations; 4 sectors; 72 quarters (18.00 years); 39 missing observations; 86.5% coverage; unbalanced panel.

D.2. Country-specific coverage of the PPI dataset

The main characteristics of each country's subsample are summarised below:

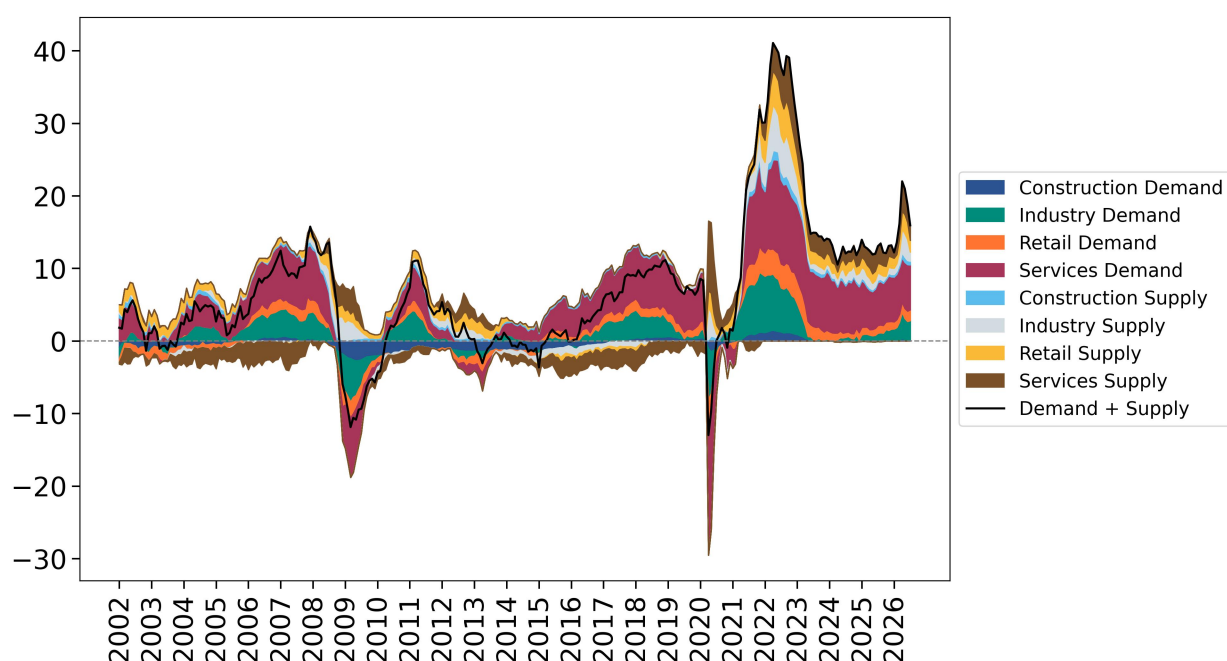
- Austria (AT): 2002Q2–2026Q2; 376 observations; 4 sectors; 97 quarters (24.25 years); 12 missing observations; 96.9% coverage; unbalanced panel.
- Belgium (BE): 2002Q2–2025Q3; 282 observations; 3 sectors; 94 quarters (23.50 years); no missing observations; 100.0% coverage; balanced panel.
- Bulgaria (BG): 2002Q2–2026Q2; 317 observations; 4 sectors; 97 quarters (24.25 years); 71 missing observations; 81.7% coverage; unbalanced panel.
- Cyprus (CY): 2008Q3–2026Q2; 213 observations; 3 sectors; 72 quarters (18.00 years); 3 missing observations; 98.6% coverage; unbalanced panel.
- Czechia (CZ): 2002Q2–2026Q2; 329 observations; 4 sectors; 97 quarters (24.25 years); 59 missing observations; 84.8% coverage; unbalanced panel.
- Germany (DE): 2002Q2–2026Q2; 374 observations; 4 sectors; 97 quarters (24.25 years); 14 missing observations; 96.4% coverage; unbalanced panel.
- Denmark (DK): 2002Q2–2026Q2; 243 observations; 3 sectors; 97 quarters (24.25 years); 48 missing observations; 83.5% coverage; unbalanced panel.
- Estonia (EE): 2002Q3–2026Q2; 300 observations; 4 sectors; 96 quarters (24.00 years); 84 missing observations; 78.1% coverage; unbalanced panel.

- Greece (EL): 2002Q2–2026Q2; 306 observations; 4 sectors; 97 quarters (24.25 years); 82 missing observations; 78.9% coverage; unbalanced panel.
- Spain (ES): 2002Q2–2026Q2; 259 observations; 3 sectors; 97 quarters (24.25 years); 32 missing observations; 89.0% coverage; unbalanced panel.
- Finland (FI): 2002Q2–2026Q2; 366 observations; 4 sectors; 97 quarters (24.25 years); 22 missing observations; 94.3% coverage; unbalanced panel.
- France (FR): 2002Q2–2026Q2; 343 observations; 4 sectors; 97 quarters (24.25 years); 45 missing observations; 88.4% coverage; unbalanced panel.
- Croatia (HR): 2009Q2–2026Q2; 266 observations; 4 sectors; 69 quarters (17.25 years); 10 missing observations; 96.4% coverage; unbalanced panel.
- Hungary (HU): 2002Q2–2026Q2; 322 observations; 4 sectors; 97 quarters (24.25 years); 66 missing observations; 83.0% coverage; unbalanced panel.
- Ireland (IE): 2016Q3–2023Q1; 81 observations; 3 sectors; 27 quarters (6.75 years); no missing observations; 100.0% coverage; balanced panel.
- Italy (IT): 2002Q2–2020Q1; 216 observations; 3 sectors; 72 quarters (18.00 years); no missing observations; 100.0% coverage; balanced panel.
- Lithuania (LT): 2005Q2–2026Q2; 271 observations; 4 sectors; 85 quarters (21.25 years); 69 missing observations; 79.7% coverage; unbalanced panel.
- Luxembourg (LU): 2002Q2–2026Q2; 193 observations; 2 sectors; 97 quarters (24.25 years); 1 missing observation; 99.5% coverage; unbalanced panel.
- Latvia (LV): 2002Q2–2026Q2; 314 observations; 4 sectors; 97 quarters (24.25 years); 74 missing observations; 80.9% coverage; unbalanced panel.
- Malta (MT): 2004Q3–2026Q2; 189 observations; 4 sectors; 88 quarters (22.00 years); 163 missing observations; 53.7% coverage; unbalanced panel.
- Netherlands (NL): 2002Q2–2026Q1; 283 observations; 4 sectors; 96 quarters (24.00 years); 101 missing observations; 73.7% coverage; unbalanced panel.
- Poland (PL): 2002Q2–2026Q2; 290 observations; 4 sectors; 97 quarters (24.25 years); 98 missing observations; 74.7% coverage; unbalanced panel.
- Portugal (PT): 2002Q2–2026Q2; 366 observations; 4 sectors; 97 quarters (24.25 years); 22 missing observations; 94.3% coverage; unbalanced panel.
- Romania (RO): 2005Q2–2026Q2; 314 observations; 4 sectors; 85 quarters (21.25 years); 26 missing observations; 92.4% coverage; unbalanced panel.
- Serbia (RS): 2013Q3–2026Q2; 153 observations; 3 sectors; 52 quarters (13.00 years); 3 missing observations; 98.1% coverage; unbalanced panel.
- Sweden (SE): 2002Q2–2026Q2; 283 observations; 3 sectors; 97 quarters (24.25 years); 8 missing observations; 97.3% coverage; unbalanced panel.

- Slovenia (SI): 2002Q2–2026Q2; 345 observations; 4 sectors; 97 quarters (24.25 years); 43 missing observations; 88.9% coverage; unbalanced panel.
- Slovakia (SK): 2002Q2–2026Q2; 350 observations; 4 sectors; 97 quarters (24.25 years); 38 missing observations; 90.2% coverage; unbalanced panel.
- Türkiye (TR): 2008Q2–2026Q2; 190 observations; 3 sectors; 73 quarters (18.25 years); 29 missing observations; 86.8% coverage; unbalanced panel.

E. Additional results

Figure E.1: Decomposition of aggregated demand and supply pressures in the euro area by sectors



Source: European Commission (2026a) and author's calculations.

Seasonally adjusted. Weighted by gross value added of detailed industries (NACE Rev. 2) (Eurostat, 2026) within the sectors for the whole economy.

Table E.1: Firms' price expectations and alternative GVA deflators (price indices from GVA) at the sectoral level

	I	II	III	IV	V	VI	VII
Deflator_yoy_lag1		0.656*** (0.046)	0.639*** (0.048)	0.642*** (0.050)	0.625*** (0.052)	0.625*** (0.052)	0.626*** (0.052)
Wage_yoy_lag1				-0.016 (0.037)	-0.018 (0.037)	-0.018 (0.037)	-0.019 (0.037)
$I_{2021Q4:2023Q3}$						3.121*** (0.454)	3.357*** (0.523)
Demand_lag1	0.088*** (0.020)	0.034*** (0.008)	0.045*** (0.011)	0.034*** (0.009)	0.044*** (0.012)	0.044*** (0.012)	0.046*** (0.012)
Supply_lag1	0.023 (0.022)	0.016 (0.010)	0.034*** (0.013)	0.020** (0.010)	0.033** (0.013)	0.033** (0.013)	0.039*** (0.012)
Supply_lag1 $\times I_{2021Q4:2023Q3}$							-0.022 (0.024)
Sector FE	YES	YES		YES			
Sector-Country FE			YES		YES	YES	YES
Country-Time FE	YES	YES	YES	YES	YES	YES	YES
N	9,941	9,941	9,941	9,206	9,206	9,206	9,206
Obs./country	310.66	310.66	310.66	317.45	317.45	317.45	317.45
Countries	32	32	32	29	29	29	29
R ²	0.719	0.841	0.843	0.857	0.858	0.858	0.858
Adj. R ²	0.615	0.782	0.782	0.804	0.803	0.803	0.803

Note: Standard errors are clustered at the country level.

The included countries are: Austria, Belgium, Bulgaria, Cyprus, Czechia, Germany, Denmark, Estonia, Greece, Spain, Finland, France, Croatia, Hungary, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, the Netherlands, Poland, Portugal, Romania, Serbia, Sweden, Slovenia, Slovakia, and Türkiye.

Table E.2: Firms' price expectations and PPI inflation with alternative slack

	I	II	III	IV	V	VI	VII
PPI_yoy_lag1		0.844*** (0.020)	0.836*** (0.023)	0.862*** (0.011)	0.854*** (0.014)	0.854*** (0.014)	0.853*** (0.014)
Vacancies_yoy_lag1				-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
$I_{2021Q4:2023Q3}$						-0.256 (0.303)	-1.387 (0.870)
Demand_lag1	0.104*** (0.018)	0.028*** (0.005)	0.038*** (0.008)	0.036*** (0.009)	0.045*** (0.013)	0.045*** (0.013)	0.037*** (0.012)
Supply_lag1	0.101*** (0.030)	0.022*** (0.008)	0.031*** (0.012)	0.022 (0.014)	0.035* (0.020)	0.035* (0.020)	0.020 (0.016)
Demand_lag1 $\times I_{\text{event}}$							0.065 (0.047)
Supply_lag1 $\times I_{\text{event}}$							0.015 (0.041)
Sector FE	YES	YES		YES			
Sector-Country FE			YES		YES	YES	YES
Country-Time FE	YES	YES	YES	YES	YES	YES	YES
N	8,776	8,776	8,776	4,417	4,417	4,417	4,417
Obs./country	265.94	265.94	265.94	169.88	169.88	169.88	169.88
Countries	33	33	33	26	26	26	26
R ²	0.727	0.924	0.924	0.903	0.904	0.904	0.904
Adj. R ²	0.598	0.888	0.887	0.853	0.851	0.851	0.852

Note: Standard errors are clustered at the country level.

The included countries are Belgium, Bulgaria, Cyprus, Czechia, Germany, Denmark, Estonia, Greece, Spain, Finland, France, Croatia, Hungary, Ireland, Lithuania, Luxembourg, Latvia, Malta, the Netherlands, Poland, Portugal, Romania, Sweden, Slovenia, Slovakia, and the United Kingdom.

Table E.3: Firms' price expectations and GVA deflators at the sectoral level with alternative fixed effects

	I	II	III	IV
Deflator_yoy_lag1				0.654*** (0.030)
Wage_yoy_lag1		0.142*** (0.015)	0.142*** (0.015)	0.042*** (0.008)
<i>I</i> _{2021Q4:2023Q3}			5.020*** (0.842)	2.376*** (0.716)
Demand_lag1	0.094*** (0.013)	0.078*** (0.011)	0.078*** (0.011)	0.031*** (0.006)
Supply_lag1	0.005 (0.025)	0.017 (0.022)	0.017 (0.022)	0.019** (0.009)
Sector FE	YES	YES	YES	YES
Country FE	YES	YES	YES	YES
Time FE	YES	YES	YES	YES
N	10,171	9,400	9,400	9,400
Obs./country	317.84	324.14	324.14	324.14
Countries	32	29	29	29
R ²	0.263	0.322	0.322	0.614
Adj. R ²	0.254	0.312	0.312	0.608

Note: Standard errors are clustered at the country level.

The included countries are: Austria, Belgium, Bulgaria, Cyprus, Czechia, Germany, Denmark, Estonia, Greece, Spain, Finland, France, Croatia, Hungary, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, the Netherlands, Poland, Portugal, Romania, Serbia, Sweden, Slovenia, Slovakia, and Türkiye.

Table E.4: Firms' price expectations and GVA deflators at the sectoral level with alternative fixed effects and y-o-y vacancies

	I	II	III	IV
Deflator_yoy_lag1				0.632*** (0.040)
Vacancies_yoy_lag1		0.000 (0.001)	0.000 (0.001)	0.001** (0.000)
<i>I</i> _{2021Q4:2023Q3}			7.969*** (1.529)	5.481*** (1.164)
Demand_lag1	0.094*** (0.013)	0.074*** (0.018)	0.074*** (0.018)	0.028*** (0.009)
Supply_lag1	0.005 (0.025)	0.011 (0.024)	0.011 (0.024)	0.013 (0.012)
Sector FE	YES	YES	YES	YES
Country FE	YES	YES	YES	YES
Time FE	YES	YES	YES	YES
N	10,171	4,723	4,723	4,723
Obs./country	317.84	188.92	188.92	188.92
Countries	32	25	25	25
R ²	0.263	0.309	0.309	0.588
Adj. R ²	0.254	0.295	0.295	0.580

Note: Standard errors are clustered at the country level.

The included countries are: Belgium, Bulgaria, Cyprus, Czechia, Germany, Denmark, Estonia, Greece, Spain, Finland, France, Croatia, Hungary, Ireland, Lithuania, Luxembourg, Latvia, Malta, the Netherlands, Poland, Portugal, Romania, Sweden, Slovenia, and Slovakia.

Table E.5: Firms' price expectations and PPI inflation at the sectoral level with alternative fixed effects

	I	II	III	IV
PPI_yoy_lag1				0.875*** (0.025)
Wage_yoy_lag1		0.355*** (0.089)	0.355*** (0.089)	0.015** (0.006)
<i>I</i> _{2021Q4:2023Q3}			9.062*** (1.263)	0.360 (0.282)
Demand_lag1	0.095*** (0.014)	0.058*** (0.016)	0.058*** (0.016)	0.022*** (0.004)
Supply_lag1	0.091*** (0.027)	0.088*** (0.023)	0.088*** (0.023)	0.019** (0.007)
Sector FE	YES	YES	YES	YES
Country FE	YES	YES	YES	YES
Time FE	YES	YES	YES	YES
N	8,776	8,134	8,134	8,134
Obs./country	265.94	280.48	280.48	280.48
Countries	33	29	29	29
R ²	0.491	0.575	0.575	0.893
Adj. R ²	0.483	0.569	0.569	0.891

Note: Standard errors are clustered at the country level.

The included countries are: Austria, Belgium, Bulgaria, Cyprus, Czechia, Germany, Denmark, Estonia, Greece, Spain, Finland, France, Croatia, Hungary, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, the Netherlands, Poland, Portugal, Romania, Serbia, Sweden, Slovenia, Slovakia, and Türkiye.

Table E.6: Firms' price expectations and alternative GVA deflators (price indices from GVA) at the sectoral level with alternative fixed effects

	I	II	III	IV
Deflator_yoy_lag1				0.742*** (0.077)
Wage_yoy_lag1		0.380*** (0.101)	0.380*** (0.101)	0.057*** (0.017)
<i>I</i> _{2021Q4:2023Q3}			7.380*** (1.671)	2.543*** (0.534)
Demand_lag1	0.101*** (0.017)	0.058*** (0.014)	0.058*** (0.014)	0.023*** (0.007)
Supply_lag1	0.007 (0.036)	0.019 (0.029)	0.019 (0.029)	0.009 (0.012)
Sector FE	YES	YES	YES	YES
Country FE	YES	YES	YES	YES
Time FE	YES	YES	YES	YES
N	9,941	9,206	9,206	9,206
Obs./country	310.66	317.45	317.45	317.45
Countries	32	29	29	29
R ²	0.403	0.524	0.524	0.772
Adj. R ²	0.396	0.517	0.517	0.769

Note: Standard errors are clustered at the country level.

The included countries are: Austria, Belgium, Bulgaria, Cyprus, Czechia, Germany, Denmark, Estonia, Greece, Spain, Finland, France, Croatia, Hungary, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, the Netherlands, Poland, Portugal, Romania, Serbia, Sweden, Slovenia, Slovakia, and Türkiye.

Table E.7: Firms' price expectations and PPI inflation with alternative fixed effects

	I	II	III	IV
PPI_yoy_lag1				0.854*** (0.007)
Vacancies_yoy_lag1		-0.002** (0.001)	-0.002** (0.001)	-0.000 (0.000)
<i>I</i> _{2021Q4:2023Q3}			6.728*** (0.878)	0.096 (0.200)
Demand_lag1	0.095*** (0.014)	0.091*** (0.017)	0.091*** (0.017)	0.030*** (0.006)
Supply_lag1	0.091*** (0.027)	0.144*** (0.030)	0.144*** (0.030)	0.035*** (0.008)
Sector FE	YES	YES	YES	YES
Country FE	YES	YES	YES	YES
Time FE	YES	YES	YES	YES
N	8,776	4,417	4,417	4,417
Obs./country	265.94	169.88	169.88	169.88
Countries	33	26	26	26
R ²	0.491	0.496	0.496	0.867
Adj. R ²	0.483	0.482	0.482	0.864

Note: Standard errors are clustered at the country level.

The included countries are: Belgium, Bulgaria, Cyprus, Czechia, Germany, Denmark, Estonia, Greece, Spain, Finland, France, Croatia, Hungary, Ireland, Lithuania, Luxembourg, Latvia, Malta, the Netherlands, Poland, Portugal, Romania, Sweden, Slovenia, Slovakia, and the United Kingdom.