

Monetary policy, relative prices and inflation control: flexibility born out of success¹

The achievement of low and stable inflation on the back of credible monetary policy frameworks has coincided with a sharp and major drop in the co-movement of prices across finely disaggregated sectors of the economy. In other words, sector-specific price developments have become much more prominent in driving fluctuations in aggregate price indices. In addition, changes in the stance of monetary policy in this environment affect a rather narrow set of prices, limiting the policy's ability to steer inflation within tight ranges as well as the desirability of doing so. All told, this highlights the importance of flexibility in the pursuit of inflation targets within a credible policy regime.

JEL classification: E31, E52, E58

Ever since the Great Financial Crisis (GFC), central banks have struggled to bring inflation up towards targets, despite maintaining a highly accommodative policy stance for a long period of time. More recently, however, and partly on the back of a strong post-pandemic economic rebound underpinned by highly expansionary fiscal and monetary policies as well as supply bottlenecks, there have been widespread concerns that inflation may exceed those targets by an uncomfortably large margin (BIS (2021)). This evolving picture puts a premium on understanding inflation dynamics in an environment where inflation has been enduringly low and stable within a credible monetary policy regime.

Against this backdrop, this special feature addresses a number of questions. First, what are the relative contributions to inflation of generalised (ie common) and sector-specific (ie relative) price changes in high and low inflation environments, respectively? In answering this question, we use prices for very finely defined expenditure categories ("sectors") that underlie aggregate consumer price indices. Second, how broad across such sectors is the impact of changes in the monetary policy stance in a low and stable inflation regime? Finally, what are the implications for the conduct of monetary policy?

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Key takeaways

- In a regime of low and stable inflation, sector-specific price changes across finely defined sectors, rather than generalised price co-movements, account for most of the fluctuations in aggregate price indices.
- At the same time, changes in the monetary policy stance affect a rather narrow set of prices, limiting the ability of monetary policy to steer inflation within narrow ranges.
- All told, the evidence puts a premium on flexibility in pursuing inflation targets within a credible policy regime.

Unsurprisingly, several of these questions have been asked before. The main contribution of our analysis is to adopt a holistic approach, connecting the various dots and employing more flexible and robust statistical techniques.

Three takeaways are worth highlighting.

First, once the economy settles into a low and stable inflation regime, the contribution of the common component of price changes to inflation drops substantially and becomes much smaller than that of the sector-specific components. This pattern also holds for the rates of price changes for broad sectors (ie durables, non-durables and services).

Second, within a credible policy regime, changes in the stance of monetary policy affect a remarkably narrow set of prices. Most of these are in the services sector, which, on balance, is more sensitive to economic fluctuations.

Finally, all told, these findings put a premium on flexibility in the pursuit of inflation targets. Since adjustments in the policy stance operate largely through aggregate demand – a common factor underlying all price changes – they may be less powerful once sector-specific price changes play a dominant role. When this factor affects a narrow set of prices, an overly forceful monetary policy action may be required to nudge overall inflation towards target, potentially causing undesirable shifts in relative prices. Flexibility can be especially important to reduce the potentially unwelcome side effects of the extraordinarily accommodative policy that may be needed to raise inflation back to narrowly defined targets.

Put differently: just like a *credible* conductor of a well-rehearsed orchestra can afford to lead with minimal gestures, so a *credible* central bank can afford to let inflation evolve within a wider range of its target without energetic adjustments to the policy stance.

The analysis is structured as follows. The first section examines the evolution of the contributions of common and sector-specific price changes to overall inflation. The second focuses on the impact of changes in the stance of monetary policy. The third draws implications for policy.

An inflation process in flux

The analysis is based on US data – specifically, on monthly (seasonally adjusted) price indices and the corresponding expenditure weights for 131 narrowly defined sectors of personal consumption expenditures (PCE) published by the US Bureau of Economic Analysis. The main reason for focusing on the United States is data availability, ie long,

granular and consistent price series, which makes it possible to go back to the high inflation era of the late 1960s and 1970s. To the extent that the forces we uncover for the inflation process in the United States are also operating in other economies, the results of our analysis would apply more broadly.²

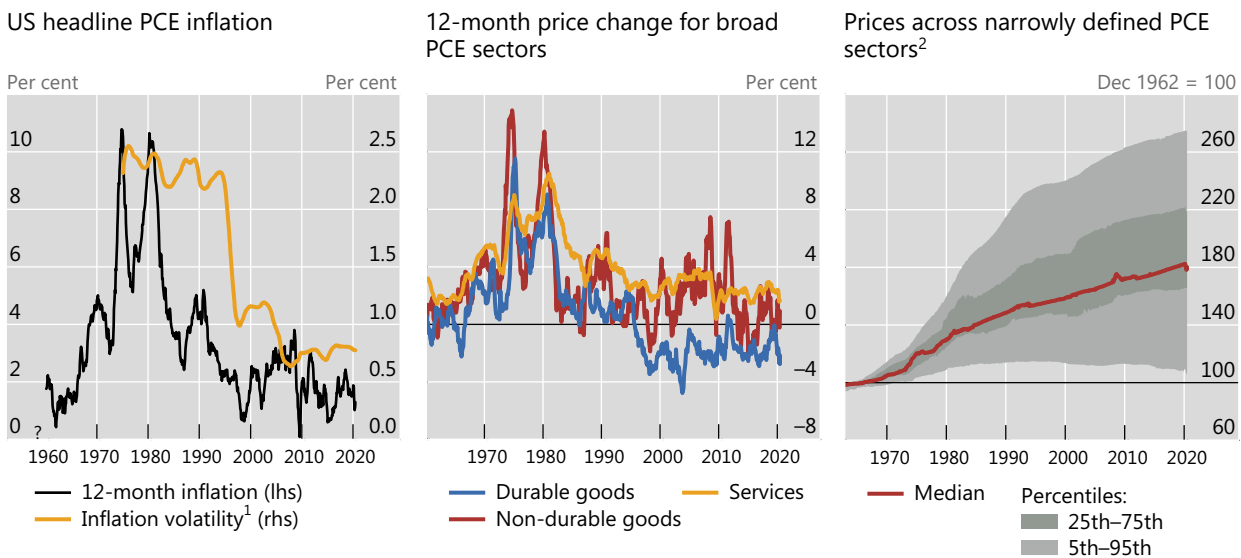
The basic features of the evolution of inflation at the aggregate level are very well documented by now (Graph 1). After being quite high and volatile during the Great Inflation era of the 1970s and early 1980s, inflation in the United States and in large parts of the world fell substantially and became much more stable starting around the mid-1980s (left-hand panel). The reduction in volatility is evident both in the trend – ie the more persistent movements that are the focus of policy – as well as in the more transitory components of inflation (not shown). At the same time, inflation has also become less persistent.³

Less well known and appreciated are the changes that took place “under the hood”. Exploring them sheds important light on the aggregate behaviour of inflation.

A critical development is the striking drop in the importance of the common component of price changes relative to the sector-specific component once inflation has become low and stable.⁴ The shift can be documented in several ways.

US headline PCE inflation and sectoral price changes

Graph 1



¹ 15-year moving standard deviation of 12-month headline personal consumption expenditures (PCE) inflation. ² Weighted percentile measures using sector expenditure shares as weights. The narrowly defined sectors refer to the 131 categories based on a four-digit breakdown of PCE.

Sources: US Bureau of Economic Analysis; author’s calculations.

- ² This is likely to be the case, as the broad evolution of inflation has been quite similar across many countries.
- ³ The reduction in volatility for both trend and transitory components and the decline in inflation persistence at the disaggregated level is documented in Borio et al (2021). Our estimates of the trend and transitory components are based on a modified version of the Hamilton filter (Hamilton (2018)) proposed by Quast and Wolters (2020).
- ⁴ In fact, the common component of price changes is arguably closer to the theoretical definition of inflation, which refers to a *generalised* increase in prices. Relatedly, in the context of US industrial production, Foerster et al (2011) document the fall in the importance of aggregate shocks and the concomitant rise in the role of sector-specific shocks since the mid-1980s.

First, the divergent rates of price changes point in this direction. While the average rates of price changes in three broad PCE sectors (durables, non-durables and services) moved roughly in sync prior to the mid-1980s, they have clearly become much more asynchronous since then (Graph 1, centre panel). In fact, they have diverged substantially since the mid-1980s, with the rate for the durable goods sector becoming markedly lower than that of services.⁵ At a more granular level, strong trends in relative prices show up in an increasing dispersion of prices for the 131 narrowly defined sectors (right-hand panel).

Second, the drop in the importance of the common inflation component also emerges from a more formal statistical analysis using price data for the 131 sectors. Specifically, we compute the time-varying share of the total variance of the 12-month percentage change in prices for each broad sector explained by the first principal component – an estimate of the common inflation component – using a rolling 15-year window.⁶ The fraction of the overall inflation variability attributable to the common inflation component drops sharply, from over 50% to between 15 and 30%, once the pre-1980 period of high and volatile inflation drops out of the estimation window (Graph 2, left-hand panel, black line). In fact, the decline is pervasive as it also applies to the rates of price changes measured at the level of the 131 expenditure sectors (middle panel). Moreover, the drop is also evident in both the trend and transitory components (not shown separately).

Finally, the footprint of the drop in the role of the common component is also visible in the smaller pass-through over time of “salient” price increases at the sector level into increases in core PCE inflation (ie inflation that excludes the volatile food and energy items). In other words, the so-called second-round effects, which would boost the importance of the common inflation component, appear to have become much smaller since the mid-1980s (see Box for details).

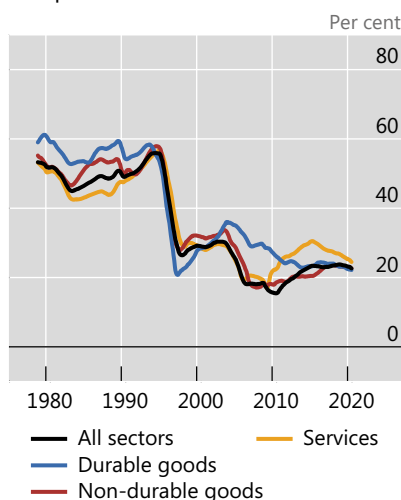
The striking decline in the importance of the common inflation component is largely responsible for another stylised fact: the significant reduction in the volatility of inflation documented previously. The bulk of the drop in the volatility of overall inflation does not reflect the decline in volatility within finely defined sectors but rather reflects the decline in the co-movement (covariance) of price changes across those sectors (Graph 2, right-hand panel).⁷ This pattern is analogous to the behaviour of the volatility of the yield on a portfolio of securities, where the co-movement of

⁵ Put differently, the well-known Balassa-Samuelson effect has become stronger.

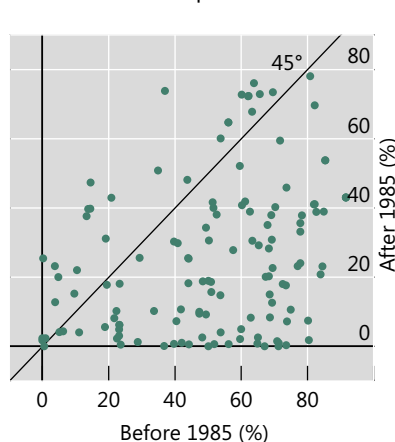
⁶ The first principal component is the linear combination of the underlying sectoral price changes that explains the highest fraction of the variance of overall inflation. It can be used as a proxy for the unobserved common component of all price changes. Dynamic factor model is another way to estimate the unobserved common inflation component (see Altissimo et al (2009) and Reis and Watson (2010)). Our more straightforward approach defines sector-specific price changes simply as idiosyncratic movements in sectoral prices that are unrelated to the common inflation component. Compared to dynamic factor models, our approach is easy to implement and computationally simple. As discussed in Stock and Watson (2002), the principal components consistently recover the space spanned by the factors when the cross-section is large, and the number of principal components used is at least as large as the true number of factors. Moreover, the principal component approach imposes fewer distributional assumptions on the data.

⁷ During this period of falling co-movement, the average bilateral correlation between sectoral price changes – which strips out the impact of the variance of sectoral price changes from the covariance – dropped from 0.5 to 0.1. In other words, the decline in correlation alone accounts for roughly 80% of the reduction in the covariance between sectoral price changes.

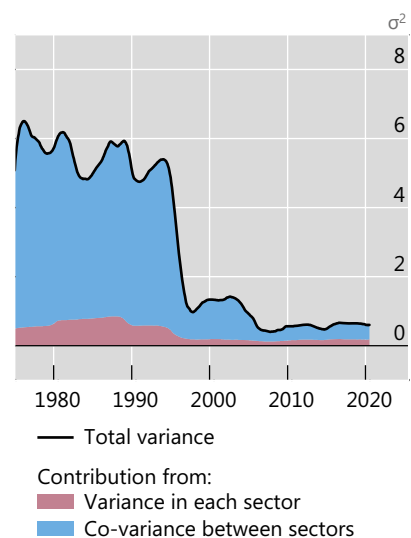
Time-varying fraction of total price-change variance due to the common component¹



Fraction of price-change variance in narrowly defined PCE sectors due to the common component²



Variance decomposition of 12-month headline PCE inflation³



¹ The common component of 12-month percent changes in prices across all sectors and within each specified broad PCE sector is estimated using a 15-year moving window. ² Each dot corresponds to one of the 131 narrowly defined PCE sectors. ³ Time-varying volatility of 12-month inflation is calculated using a 15-year moving window. The calculation of variance and co-variance contributions to the total variance of 12-month headline PCE inflation is based on the 131 narrowly defined PCE sectors.

Sources: US Bureau of Economic Analysis; authors' calculations.

yields matters much more than the volatility of yields on individual securities. The timing of the change in the volatility of inflation is equally noteworthy. Given the 15-year rolling window, the sharp drop around 1995 again reflects the effect of the pre-1980 data dropping out of the estimation window.⁸

The impact of changes in the monetary policy stance

What has the role of monetary policy been in the large drop in the importance of the common component of inflation? And what are the implications for the policy's ability to steer inflation once inflation is low and stable?

In answering these questions, it is essential to make a distinction between the monetary policy regime and changes in the stance of policy *within* the regime. The regime involves the more systematic aspects of the response of policy to economic conditions (the central bank's "reaction function"). Among other things, a well-understood and credible reaction function is important in shaping inflation expectations of workers, firms and other market participants. Changes in the policy stance, on the other hand, are better regarded as marginal adjustments to policy settings.

There is no doubt that the change in the policy regime has been *the* critical force bringing inflation down and hence reducing the importance of the common

⁸ Eo et al (2020) document the divergent dynamics of goods and service prices in the United States, Australia and Canada, with the correlation between the two falling to essentially zero since the 1990s in all three countries. Moreover, they find that variations in trend inflation are now entirely dominated by fluctuations in trend prices in the service sector.

component, not least by mitigating second-round effects from sector-specific price shocks. The timing of the drop in its importance is quite telling: it coincides with the impact of the sharp monetary tightening in the late 1970s and early 1980s (the “Volcker shock”), in response to an inflation rate that was becoming increasingly unmoored.

What about the power of changes in the policy stance within a regime? To formally examine this issue, we first need to identify marginal adjustments in policy settings (or “shocks”). The idea is to capture shifts in the stance of policy that are both unforeseen by market participants and not due to the Fed’s concerns about either current or anticipated economic conditions. We do so very precisely, using high-frequency minute-by-minute financial data, while controlling for the Fed’s own assessment of the macroeconomic outlook, as summarised by “Greenbook/Tealbook” forecasts.⁹ The price to be paid for such finely calibrated analysis is that estimates of the shocks are only available from mid-1992, ie for the low inflation period.

Based on this identification strategy, we argue that monetary policy may face significant limitations when seeking to steer inflation within relatively narrow ranges in a low and stable inflation regime.¹⁰ Two pieces of evidence justify this argument.

For one, given that monetary policy – as a tool influencing aggregate activity – transmits mainly through the common component of price changes, one possible implication of the observed decline in the importance of the common component is a diminished ability of marginal adjustments to the policy stance to steer inflation.¹¹ This would be so, for example, if the reduced role of the common component reflected more muted second-round effects.

In addition, armed with the measure of marginal adjustments in the policy stance, we consider their price impact on each of the 131 narrowly defined sectors over different horizons during the period July 1992–December 2018. Specifically, we use the standard local projections method proposed by Jordà (2005) and run the following regression for each sector i and horizon $h=1,\dots,48$ months:

$$p_{i,t+h} - p_{i,t-1} = \alpha_{i,h} + \beta_{i,h}MP_t + \sum_{s=1}^{11} \rho_{i,h,s}\Delta p_{i,t-s} + \lambda'_{i,h}x_t + \epsilon_{i,t+h}$$

⁹ These high-frequency monetary policy shocks are constructed using the methodology developed by Miranda-Agrippino and Ricco (2021). We are grateful to Andrea Ajello and Giovanni Favara for providing us with an updated series of the original shocks, using the Fed’s publicly available forecasts through December 2014.

¹⁰ Thus, the evidence in this section is consistent with the well known decline in the sensitivity of inflation to pressure on an economy’s productive capacity, ie the so-called flattening of the Phillips curve.

¹¹ Our results (not shown) confirm the key role of the common component in the transmission of monetary policy. Using the empirical framework below, we separately examine the impact of marginal adjustments in the monetary policy stance on the common and sector-specific components of price fluctuations. We indeed find that the impact on the common component is economically and statistically significant. By contrast, the impact on the various sector-specific price fluctuations is largely insignificant; see Borio et al (2021). Moreover, an analysis therein based on a less satisfactory but standard identification strategy that covers a longer time span also suggests a reduction in the impact of monetary policy shocks across regimes.

where $p_{i,t+h}$ is the log price level for sector i in month $t+h$, MP_t is the monetary policy shock in month t and x_t is a vector of aggregate controls included to filter out the impact of macroeconomic conditions on price changes within each sector.¹²

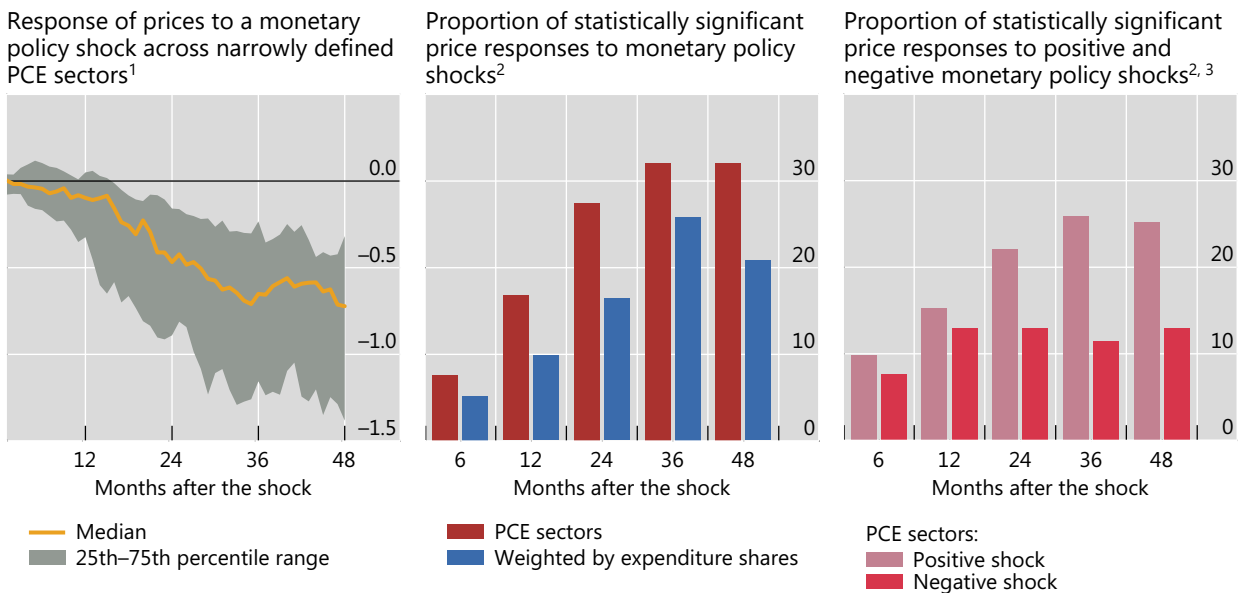
Over a period that witnessed a diminished role for the common component in price fluctuations, we find that the response of prices to monetary policy shocks appears limited to a few sectors (Graph 3).¹³ This is so even if one allows for natural lags in the policy's impact, as shown by the increasing (absolute) size of the point estimates ($\beta_{i,h}$ in the equation above) as time unfolds (left-hand panel).¹⁴

Specifically, it is striking that the impact on prices is statistically significant at conventional levels for only a small fraction of narrowly defined sectors – less than 20% at the 10% significance level after 12 months (Graph 3, centre panel). Even after 36 months, the fraction of sectors for which the price response is statistically

The impact of monetary policy on prices varies across sectors

In per cent

Graph 3



¹ Weighted percentiles of the response of prices across 131 narrowly defined personal consumption expenditure (PCE) sectors to a monetary policy shock of 25 basis points. The weights are equal to the sector-specific average expenditure shares. ² Significant at 10% level. ³ In this specification, positive (ie contractionary) and negative (ie expansionary) monetary policy shocks of 25 basis points are allowed to have differential effects on prices.

Sources: Board of Governors of the Federal Reserve System; US Bureau of Economic Analysis; authors' calculations.

¹² The set of control variables includes: a survey-based measure of long-term PCE inflation expectations; the unemployment gap; the 12-month log-difference in average hourly earnings; the 1-month log-difference in the WTI spot price; and the 1-month difference in the Baa-Aaa corporate bond credit spread.

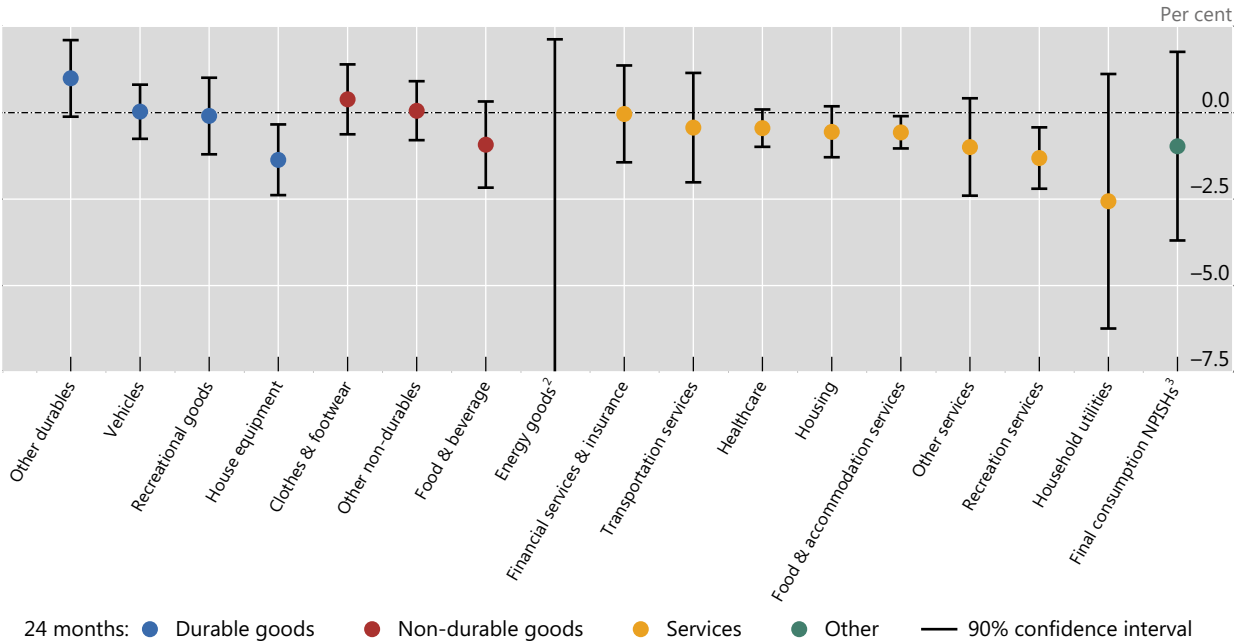
¹³ Note that because of its wide reach, the effects of monetary policy shocks transmit mainly through the common component of price changes. That said, the importance of the common component ("factor loadings") varies across sectors. Hence monetary policy affects each sector differently despite its generalised impact.

¹⁴ The sluggish response of prices to a monetary policy shock is in line with those of Boivin et al (2009), who examine the impact of such shocks on disaggregated PCE sectors using a factor-augmented vector auto-regression (FAVAR) model. In their framework, monetary policy shocks are identified recursively, ie monetary policy is assumed to respond to contemporaneous fluctuations in the

significant rises to only about a third. Moreover, in terms of expenditure shares, the proportion is even lower across all horizons. In other words, the sectors whose prices are responsive to marginal adjustments in the stance of policy have a relatively small weight in the overall price index. Finally, the impact of monetary policy appears to be asymmetric: the fraction of sectors with statistically significant price responses is noticeably lower for expansionary monetary shocks across all horizons, compared with contractionary shocks (right-hand panel).

Which sectors are relatively more responsive to changes in the policy stance? Not surprisingly, the bulk are in services, which on balance tend to be more sensitive to economic fluctuations ("cyclically sensitive"). This is the message of an analysis based on 17 sectors and the cumulative price impact of monetary policy shocks after two years (Graph 4).¹⁵

The monetary policy impact is concentrated in the service sector¹ Graph 4



¹ The dots show the point estimates of the response of prices at the 24-month horizon to a 25 basis points monetary policy shock, while the black lines represent the associated 90% confidence intervals. ² The point estimate of the impulse response of energy goods prices (not shown) is -14%, with a 90% confidence interval equal to [-30%, 2%]. ³ Non-profit institutions serving households.

Sources: Board of Governors of the Federal Reserve System; US Bureau of Economic Analysis; authors' calculations.

macroeconomic factors, whereas policy shocks are assumed to affect the economy with a lag. By comparison, our high-frequency identification approach, making use of movements in interest rates in a narrow window around policy meetings, is less prone to the endogeneity problem (see Miranda-Agrippino and Ricco (2021) for extensive discussion).

¹⁵ These sectors correspond to those that Stock and Watson (2019) use when considering whether the impact of monetary policy differs between cyclically sensitive and cyclically insensitive sectors. In fact, there is a reasonable correspondence between the sectors that they deem to be cyclically sensitive and those whose price responses are statistically significant in our analysis: across various horizons, around two thirds of the sectors for which we find significant responses are also cyclically sensitive according to their terminology.

Second-round effects feature less prominently in inflation dynamics

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This box empirically examines how the importance of relative price “shocks” has changed across high and low inflation regimes. It also notes what the analysis can say about current conditions, given questions about the implications of the recent spate of sizable price increases for future inflation.

The construction of relative price shocks involves two steps. In the first step, we obtain relative price levels by estimating the following regression for each narrowly defined PCE sector:

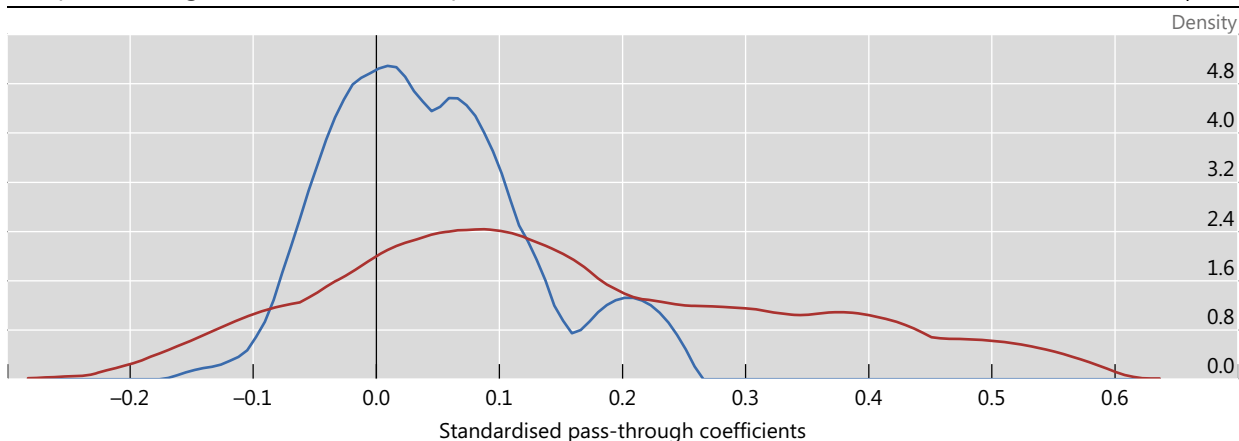
$$\Delta p_{i,t} = \alpha_i + \lambda_i PC1_t + \epsilon_{i,t}$$

where $\Delta p_{i,t}$ denotes the monthly log-difference of the price index in sector i and $PC1_t$ is the first principal component of $\Delta p_{i,t}$ estimated across all 131 sectors. The above regression is estimated separately on two non-overlapping subsamples: January 1960–December 1985, a regime of high and volatile inflation; and January 1986–December 2019, a regime of low and stable inflation. To construct relative price levels for each subsample, we cumulate the estimated residuals $\hat{\epsilon}_{i,t}$ within each sector, thereby constructing (log) relative price levels, denoted by $rp_{i,t}$, which are unrelated to fluctuations in the regime-specific common inflation component.

In the second step, we analyse how the pass-through of “salient” and positive relative price shocks to core PCE inflation – the Fed’s preferred inflation measure – varies across the two inflation regimes. All else equal, these changes are the most likely to pass through: being large, they are more noticeable; and being positive, they tend to constrain consumers more than decreases. Similar considerations may apply to the decisions of producers, which ultimately underlie changes in the prices of the consumer basket.

The pass-through of “salient” relative price increases to core PCE inflation has declined¹

Graph A1



¹ Each line shows the weighted kernel density estimate (ie a smoothed histogram) of the distribution of pass-through coefficients of “salient” relative price increases to 12-month ahead core personal consumption expenditure (PCE) inflation for the specified sample period. The weights are equal to the sector-specific average expenditure shares in each sample period.

Sources: US Bureau of Economic Analysis; authors’ calculations.

We implement these ideas empirically using the non-linear transformation developed by Hamilton (2003) to analyse the impact of oil price shocks on the real economy. Specifically, we define a salient relative price increase in sector i in month t , denoted by $\Delta rp_{i,t}^+$, as

$$\Delta rp_{i,t}^+ = \max\{0, rp_{i,t} - rp_{i,t}^*\}$$

where, $rp_{i,t}^*$ is the largest (max) (log) relative price over the previous 12 months.

With these shocks in hand, we estimate the following “pass-through” regression:

$$\pi_{t+12}^{core,12m} = \mu + \beta_i \Delta rp_{i,t}^+ + \gamma(u_t - u_t^*) + \sum_{s=0}^{11} \rho_s \pi_{t-s}^{core,12m} + v_t$$

where $\pi_{t+12}^{core,12m}$ is the 12-month core PCE inflation recorded 12 months ahead. The coefficient of interest in this specification is β_i , which measures the extent to which a salient relative price increase in a narrowly defined sector in month t feeds into core PCE inflation over the subsequent 12 months. The pass-through estimates filter out the influence of business conditions, as proxied by the deviation of employment from an indicator of full employment ($u_t - u_t^*$), and control for lagged core inflation dynamics.^②

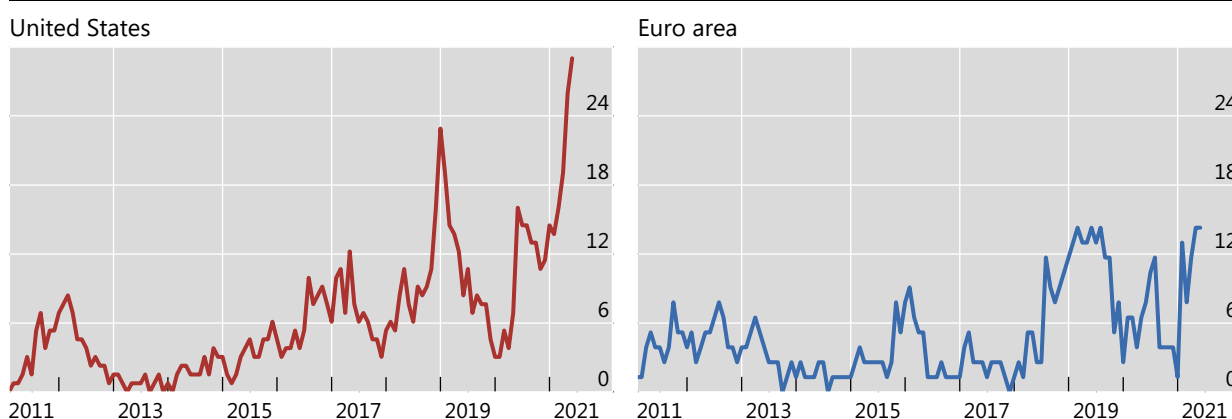
The results indicate that the pass-through of salient relative price increases has declined substantially with the transition to a low inflation regime (Graph A1). The distribution of pass-through estimates $\hat{\beta}_i$'s for the low inflation environment is much more concentrated around zero; in addition, the estimates are generally not statistically significant during this period. Put differently, the likelihood and size of second-round effects from relative price increases have diminished substantially.

To see how this analysis can shed light on the current outlook, we need to look at what is behind the recent elevated readings of overall inflation. These readings have been driven mainly by large hikes in the prices of a relatively small number of pandemic-affected goods and services.^③ In the United States and euro area, for example, the share of narrowly defined expenditure categories that registered outside price changes in recent months – most of which involve goods and services affected by the pandemic – has increased considerably relative to recent historical norms (Graph A2).

The share of sectors experiencing large positive price changes has risen recently¹

In per cent

Graph A2



¹ Large positive price change is defined as a 12-month percent change in the sector-specific price index (131 sectors for the US and 77 sectors for the EA) that is more than 2 standard deviations above its average calculated over the past 5 years.

Sources: ECB; US Bureau of Economic Analysis, authors' calculation.

A key question then is whether these large price increases in a relatively small share of the consumption basket will feed into more generalised inflation. Indeed, the second-round effects from rising energy prices feature prominently in explanations of the rise in global inflation in the 1970s. However, we currently live in a different monetary policy regime.

All else equal, the analysis in this box stresses that the recently observed price increases could be transient. This is because, assuming that past patterns continue to prevail, the pass-through of relative price shocks into inflation would be small in the current environment in which inflation has been enduringly low and stable as part of a credible monetary policy regime. At the same time, the “all-else-equal” clause is important. In particular, the post-pandemic increase in inflation is rather unusual, having taken place as part of the post-Covid normalisation process and on the back of unprecedented fiscal and monetary stimulus. The analysis here is just one piece of the jigsaw puzzle, which requires a much more holistic assessment (eg BIS (2021)).

① The views expressed are those of the authors and do not necessarily reflect the views of the Bank for International Settlements or the Bank of Thailand. ② The unemployment gap is defined as the difference between the civilian unemployment rate and its estimate of the natural rate, where the latter is taken from the FRB/US model, a large-scale macroeconomic model of the US economy used by the Fed. ③ Admittedly, the rise in inflation is not entirely due to increases in the prices of pandemic-affected goods and services. Surging commodity prices have also contributed to higher inflation on the back of strong recoveries in China and in many advanced economies.

Monetary policy amidst sector-specific price changes

The previous empirical findings raise important considerations for the conduct of monetary policy. In particular, they favour flexibility in the pursuit of inflation targets within a credible policy regime. This may be especially so when inflation is hovering persistently below target, calling for a monetary easing.

There are two sets of reasons for this conclusion.

The first has to do with the central bank's *ability* to steer inflation. When sector-specific price changes account for the bulk of variations in the general price index, monetary policy may face headwinds in moving inflation in the desired direction. One reason is that idiosyncratic price changes are less responsive to fluctuations in aggregate demand. In addition, adjustments in the policy stance affect only a narrow set of prices that together have a relatively small weight in the overall index.¹⁶ All told, this increases the need for large shifts in the stance to achieve a given target.

The second set of reasons has to do with the *desirability* of seeking to steer inflation precisely or the need to do so.

For one, not surprisingly, a substantial fraction of sector-specific price changes are *transitory*. Central banks can thus look through them. Responding to them can easily lead to an overreaction, as such changes are self-correcting. The justification for looking through such changes would be especially strong if their transitory nature reflected not just regime-induced well-anchored inflation expectations, but also, or even primarily, economic agents' "rational inattention";¹⁷ ie their tendency to pay little attention to inflation when it is low and stable since it makes little difference to their well-being – a kind of self-correcting mechanism.

In addition, and arguably less prominent in the policy debate, the still important role of *trend* changes in sector-specific prices gives rise to tougher challenges. In a low and stable inflation environment, such changes in relative prices tend to reflect the fundamental evolution of demand patterns – preferences reflect income levels – and technology – productivity growth differs across sectors. As a result, they provide critical signals for the efficient allocation of resources and, short-term influences aside, are beyond monetary policy's reach.¹⁸ Seeking to compensate for such changes in sector-specific prices to achieve a specific inflation target may be counterproductive.

To illustrate this more concretely, consider the economic environment that has emerged since the 1990s. Not least under the influence of globalisation, (eg Auer et

¹⁶ Indeed, from this perspective, relying on US data would tend to *overestimate* the share of price categories over which monetary policy exerts influence. This is because the US economy is relatively closed, and the share of the service sector (60%) tends to be larger than elsewhere.

¹⁷ See Maćkowiak et al (2021) for a review of the concept. Indeed, as noted by Greenspan (1994), price stability can be defined as an environment in which inflation does not materially influence the behaviour of economic agents.

¹⁸ The importance of allowing for rich heterogeneity across sectors in assessing inflation outcomes is emphasised in Aoki (2001) and Wolman (2011), while Adam and Weber (2019) extend the analysis to consider firm heterogeneity. Conceptually, it would be optimal for monetary policy to target a narrower set of prices – namely those that display the highest degree of stickiness – than those contained in the CPI. In practice, communication challenges in doing so are formidable. The use of core inflation, eg excluding the change in especially volatile items such as food and energy, offers the simplest way of moving in this direction.

al (2017)), most economies have seen muted increases, if not declines, in the prices of many tradeable goods, especially durables (recall middle panel of Graph 1). These have kept a lid on overall inflation, which on average has hovered below central banks' objectives. The prices of these tradeable goods have also lagged behind those in the services sector, resulting in a large change in relative prices. To raise inflation in this environment, monetary policy would have to lean harder on those prices over which it has greater influence, largely those in the service sector, which also tend to be less flexible. All else equal, this would call for stronger and possibly more persistent easing.¹⁹ In turn, this would increase the likelihood of hitting the effective lower bound for policy rates and exacerbate any potential side-effects of keeping interest rates low for long (eg BIS (2020), Borio (2021)).²⁰

All told, the success of credible monetary frameworks in ushering in a low and stable inflation regime goes hand-in-hand with pervasive changes in price dynamics, which puts a premium on flexibility in the pursuit of narrowly defined inflation targets. This underlines the importance of a degree of tolerance for deviations of inflation from targets within certain ranges and of longer horizons to bring inflation back within those ranges. Such fluctuations, for example those that reflect fundamental sector-specific developments, may pose less of a concern, and offsetting them could require large policy adjustments that entail the risk of undesired side effects, notably when seeking to raise inflation. If so, the need for greater flexibility would be akin to a Goodhart's law: once inflation has been successfully anchored, its role as a gauge for policy action may be diminished.

Conclusion

This special feature has highlighted the importance of flexibility in the pursuit of narrowly defined inflation targets in an environment of low and stable inflation, owing to pervasive changes in the dynamics of price movements. Recent modifications to the monetary policy frameworks of the Federal Reserve and the ECB, albeit quite different, have moved in this direction. Our analysis suggests that, *all else equal*, such flexibility is especially warranted when inflation undershoots targets

If applied to the current context, in which inflation concerns have become more prominent, our analysis also speaks in favour of flexibility in the response. This is not least because a small number of sector-specific components of inflation have seen especially large increases in recent months. That said, the inference from our analysis is just one piece of information that needs to be part of a more holistic assessment examining the underlying forces at work (eg BIS (2021)). It is most critical to ensure – taking whatever actions are needed – that inflation remains low and stable, anchored to a credible monetary policy framework.

¹⁹ The evidence that an easing of the policy stance impacts a narrower set of prices than a tightening strengthens this inference.

²⁰ Among the marginally statistically significant sectors, housing services have a particularly high weight (14%) in the total PCE basket, and this category contributes substantially to the shape of the overall price response. The sector is also by far the most cyclically sensitive. To the extent that monetary policy needs to lean heavily on the housing sector to move overall prices, aggressive policy actions may give rise to financial stability concerns, given that the sector is closely linked to asset prices and can also be highly leveraged. For current concerns in this respect, see BIS (2021).

At a more general level, the analysis highlights the merits of examining the inflation process at a disaggregated, granular level. Understanding the evolution of relative prices, particularly persistent ones, is key and is likely to be especially useful to policymakers. By the same token, inferences from economic models that eschew such considerations can be materially misleading.

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