



Monetary policy in an era of supply headwinds – do the old principles still stand?¹

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Introduction

Good evening.

It is a great pleasure to be here today at the London School of Economics. Many thanks to Ricardo Reis for inviting me. It is a particular honour to have been invited by the department's A W Phillips Professor of Economics. Phillips was the professor whose seminal work lent its name to the famous Phillips curve, which links the level of inflation in the economy to the unemployment rate. He found that when the unemployment rate is low, or more generally when there is less spare productive capacity, inflation tends to be higher, and vice versa. After some 70 years, the Phillips curve is still at the heart of many policy discussions, including my remarks today.

I want to focus my comments on a current topic that is intensely debated in both academic and central banking circles: how should monetary policy be conducted in the face of more challenging supply side conditions? The LSE faculty has recently made important contributions to this debate, in particular with Ricardo's paper presented at our 2022 BIS Annual Conference, and Silvana Tenreyro's paper presented at the 2023 ECB Sintra forum.

Why is this topic so relevant?

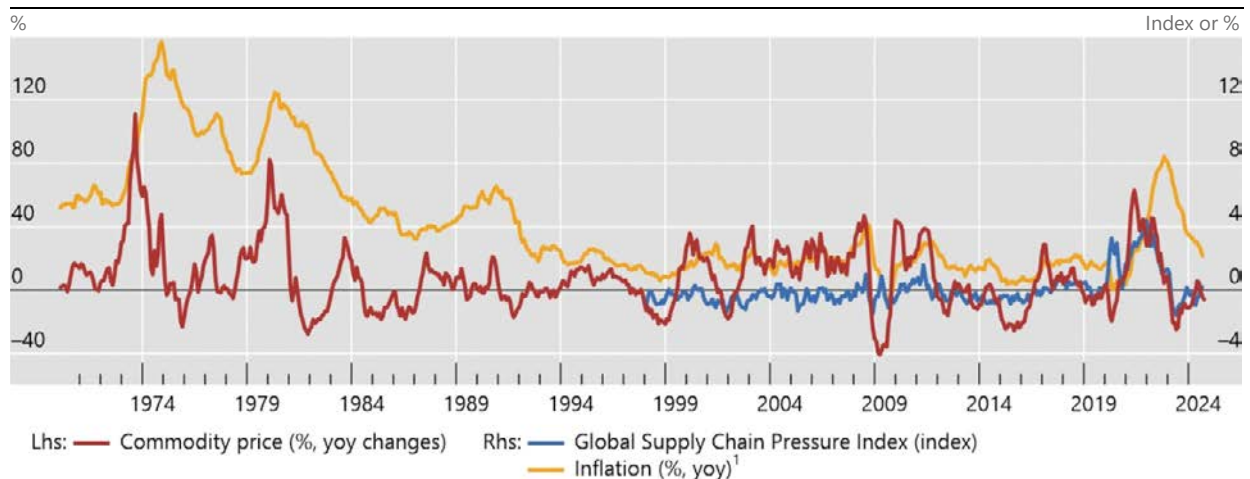
The inflation surge of 2021/22 posed a major test to central bank inflation targeting frameworks after three decades of low and stable inflation in many advanced economies. Inflation rates in advanced economies surged to levels not seen since the Great Inflation of the 1970s (Graph 1, yellow line). First were the supply chain disruptions that emerged during the much faster than anticipated recovery after the pandemic lockdowns (blue line). These were followed by the sharp rise in energy prices and, in Europe, concerns about severe energy shortages after Russia invaded Ukraine (red line). These shocks were happening against the backdrop of large demand shocks emanating from the extensive monetary and fiscal stimulus to address the economic fallout of the Covid pandemic.

¹ I would like to thank Smita Aggarwal, Ryan Banerjee, Emma Claggett, Jill Forde, Boris Hofmann, Mico Loretan, Cristina Manea and Benoît Mojon for their help in preparing these remarks and providing insightful comments. The views expressed are not necessarily those of the Bank for International Settlements.

The future may well bring more supply side challenges to inflation. Economies could become more prone to a wide range of supply shocks, from geopolitical and technological shocks to trade and climate shocks. This at a time when economic headwinds such as high and rising debt levels, the ongoing decline in working age populations and slowing globalisation are making the global economy less agile and less resilient.

Global supply chain pressures and surging commodity prices contributed to the post-pandemic inflation surge

Graph 1



¹ Average of AU, CA, EA, GB, JP, SE and US.

Sources: Federal Reserve Bank of New York; Bloomberg; national data; BIS.

Today I will highlight four main points.

- **First, the future will probably bring more volatile inflation as we face more frequent adverse supply side shocks and less elastic supply capacity.**
- **Second, more frequent adverse supply shocks mean that central banks must exercise care when assessing if they can “look through” their inflationary effects.**
- **Third, circumstances may require central banks to lean more forcefully against inflation to contain the risk of transitioning to a high-inflation regime.**
- **Looking forward, central banks will need to strengthen their analytical capability to assess the nature and transmission of supply shocks and how monetary policy should react to maintain trust in the purchasing power of money.**

In the following, I will first characterise how central banks reacted to supply shocks in the three decades that *preceded* the Covid-19 pandemic. I will note that they tended to “look through” the effects of supply shocks. Next, I will discuss both the role of supply shocks in the post-pandemic inflation surge and the lessons learned. Among those lessons is that forceful monetary policy tightening has been necessary to re-anchor inflation at low and stable levels. Finally, I will highlight why I think that, going forward, supply shocks may be more frequent and the global

economy more supply-constrained and, hence, a place where shocks are more inflationary. I will conclude by drawing implications for the future conduct of monetary policy.

Let me first take a step back and examine how central banks have typically reacted to supply shocks and the motivations for doing so.

Monetary policy and supply shocks: the practice of “looking through”

The key lesson from the traumatic Great Inflation of the 1970s was that central banks should be granted a clear mandate to provide trust in money by stabilising prices. Indeed, without trust in stable prices, households lack the certainty to make informed decisions about how much to consume or save, and firms lack the clarity to set wages, prices or investments. The mandate of price stability has commonly taken the form of targeting a low level of inflation, typically 2%, over the medium run. This is what we mean when we talk about price stability. This is also how the Bank of England’s inflation target is specified, for instance.

These inflation targeting frameworks have proven their worth to deliver low and stable inflation and to do so under a wide range of economic states.

Their core principle is that monetary policy should credibly maintain price stability, anchoring inflation expectations to the target. To do so, the conduct of monetary policy, or the monetary policy rule, needs to be characterised by a sufficiently stabilising response of policy rates to inflation. Monetary policy must tighten when inflation rises above target and loosen when it falls below. This principle has characterised the conduct of monetary policy by major central banks in the era of low and stable inflation since approximately 1990.²

Recent research at the BIS provides new evidence about how advanced economy central banks used to react to supply-driven inflation prior to the Covid pandemic. It highlights a much weaker response compared with that to demand-driven inflation.³ Put simply, central banks tightened their monetary policy stance *relatively less* in response to supply-driven inflation (say, from a sudden rise in commodity prices) than to demand-driven inflation (say, from an overheating economy or tax cuts).

² See Bernanke and Mishkin (1997), Clarida et al (1999) and Svensson (2010). Central banks conventionally use the policy rate as an instrument. When the effective lower bound on nominal interest rates has constrained their ability to loosen policy sufficiently, they have activated unconventional tools such as quantitative easing, credit easing and forward guidance to provide additional stimulus.

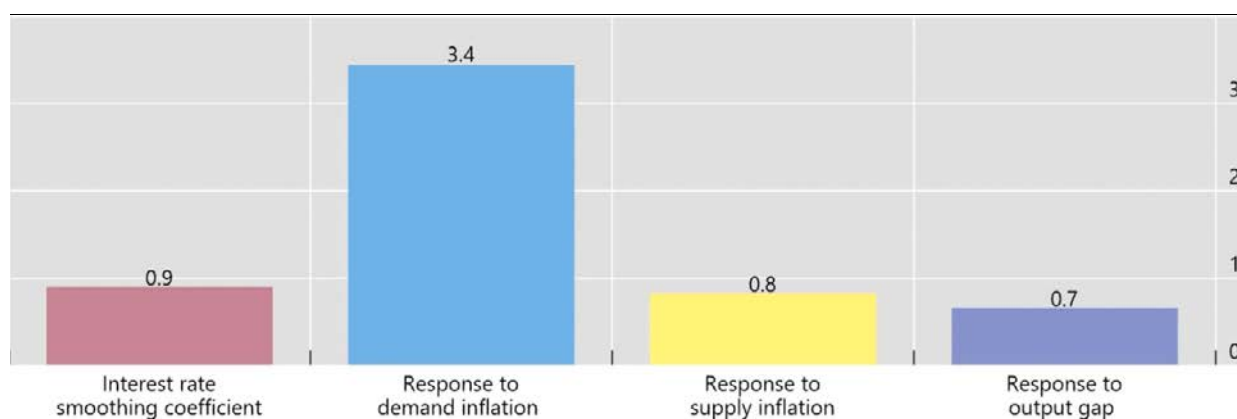
³ Hofmann et al (2024a,b). The supply-driven components of inflation are identified as those where prices and quantities move in opposite directions, while demand-driven inflation occurs when prices and quantities move in the same direction. Methodologies to decompose inflation into demand and supply factors use macroeconomic data and structural vector autoregression (SVAR) methods (Eickmeier and Hofmann (2022)), or the sectoral decomposition of personal consumption expenditure indices (Shapiro (2022)).

Graph 2 plots the monetary policy reaction based on pooled estimates from seven advanced economies with inflation targeting mandates.⁴ It shows that the monetary policy response to demand-driven inflation (blue bar) was on average more than three times larger than the response to supply-driven inflation (yellow bar). In other words, central banks appear to have largely looked through supply-driven inflation.

Taylor rule estimates and demand- vs supply-driven inflation¹

Coefficients

Graph 2



¹ Average of estimated Taylor rule coefficients in AU, CA, EA, GB, KR, SE and US with the following specification: $it_t = \rho it_{t-1} + (1-\rho)(\phi_D \pi_{t,D} + \phi_S \pi_{t,S} + \nu \tilde{y}_t) + \alpha$, where it is the policy rate (annualised), $\pi_{t,D}$ is the year-on-year demand-driven inflation, $\pi_{t,S}$ is the year-on-year supply-driven inflation and \tilde{y}_t is the output gap. The sample period varies across economies. It starts when price stability-oriented monetary policy frameworks or explicit inflation targeting regimes were established and ends when policy rates fell to the zero lower bound in the wake of the Great Financial Crisis.

Source: Based on Hofmann et al (2024a,b).

What can explain this “looking through” approach? Let me highlight three key explanations.

First, supply shocks, in particular supply-driven commodity price shocks, have often tended to be transitory. For example, adverse weather conditions can damage food crops, accidents can cause outages at oil refineries or congestion at ports can disrupt supply chains. Such adverse supply events can have a significant short-term impact on *headline* inflation, but they usually do not lead to persistently higher inflation. In the past decades, for example, rises in the price of oil in advanced economies would cause adjustments to the *price level* of various goods or services, without resulting in a permanently higher *inflation rate*. By the time monetary policy would start to have traction on aggregate demand and inflation, typically with a lag of 12–18 months, the effects of the shock on inflation would have largely subsided. A monetary policy response might even be destabilising, pushing inflation down too late while unnecessarily dampening output.⁵

⁴ The sample period varies across economies. It starts when price-stability oriented monetary policy frameworks or explicit inflation targeting regimes were established and ends when policy rates fell to the zero lower bound in the wake of the Great Financial Crisis.

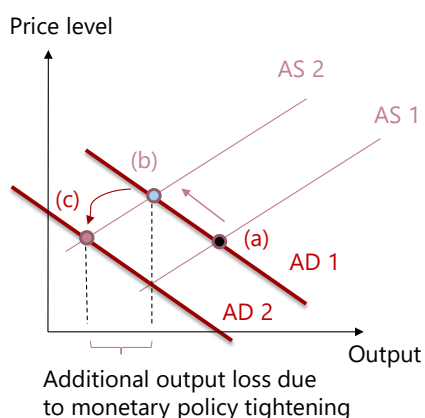
⁵ See eg Mishkin (2007), Bandera et al (2023) and Guerrieri et al (2023).

A second reason for looking through arises from the trade-offs associated with supply shocks. In simple terms, an adverse supply shock shifts the aggregate supply curve up and to the left, pushing prices up and pushing output down (Graph 3.A). If monetary policy tightens to contain the rise in prices, it comes at the cost of reducing output even further, maybe even leading to a severe recession. By contrast, in the face of a demand shock, monetary policy does not face such a trade-off as demand shocks push economic activity and prices in the same direction (Graph 3.B). Tighter monetary policy can thus counteract or even fully reverse the shock's effects. Note that the steeper the aggregate supply curve (blue line), the more demand and supply shocks affect prices and the less they affect output, as visualised in the graph for a demand shock. I will come back to this point later.

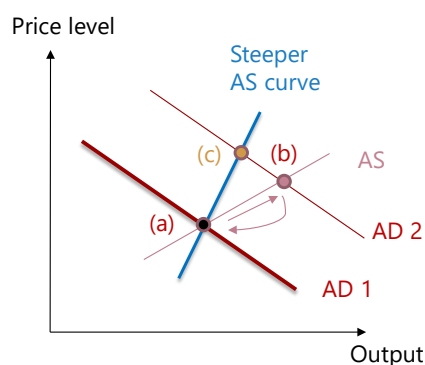
Monetary policy trade-offs in the face of supply shocks

Graph 3

A. Monetary policy response to adverse supply shocks further dampens economic activity



B. Monetary policy response to demand shocks counteracts inflation and output effects; steeper AS curve makes shocks more inflationary



AD = aggregate demand; AS = aggregate supply.

Supply shocks create a trade-off between stabilising inflation and stabilising output. In standard macroeconomic models, the optimal response of monetary policy to supply shocks is to tighten, but not as much as for demand shocks, especially if there is a chance that the shock itself (or its impact on inflation) is temporary. This implies that inflation would be allowed to temporarily overshoot its target.⁶ Such an approach is consistent with central banks' inflation targeting mandates, which allow for flexibility by aiming to stabilise inflation over the medium run.

Finally, a third reason for looking through supply-driven inflation stems from the lower risk of second-round effects when inflation expectations are anchored. Because central banks in advanced economies had, by the mid-1990s, succeeded in credibly stabilising inflation at low levels, inflation and inflation expectations had become well anchored at the central banks'

⁶ See eg Erceg et al (2000), Blanchard and Galí (2007) and Giannone and Primiceri (2024).

targets.⁷ This enabled central banks to look through the transitory inflationary consequences of supply shocks. Or, as Ricardo described it at the 2022 BIS Annual Research conference, a “[look]-through-the-shock policy is a prescription of the literature only if inflation expectations are anchored”.⁸

Lessons learned from the post-pandemic inflation surge

The post-pandemic inflation surge saw the risk of transitioning from a low- to a high-inflation regime. This experience holds important lessons for monetary policy, with implications for the look-through approach to adverse supply shocks.

Risks of inflation de-anchoring can emerge suddenly

The first lesson is that the de-anchoring of inflation can emerge suddenly. During the inflation surge, the initial relative price changes were concentrated in a few sectors, but then spread into a longer, larger and more broad-based rise in prices.⁹ These dynamics unfolded in 2021 and contributed to a significant rise in short-term inflation expectations (dark blue line in Graph 4.A).¹⁰

⁵ Emerging market economies have made material progress in stabilising inflation (see BIS (2023)). Nevertheless, due to their shorter track record of low inflation, inflation and inflation expectations tend to be less well anchored than in advanced economies.

⁸ Reis (2022).

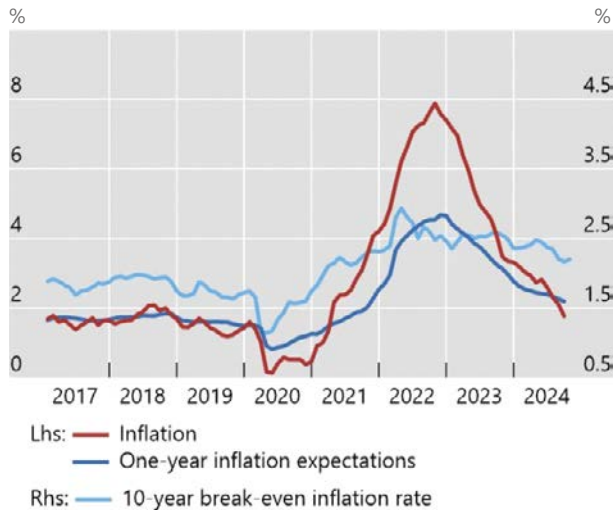
⁹ Borio et al (2023).

¹⁰ Summers (2021).

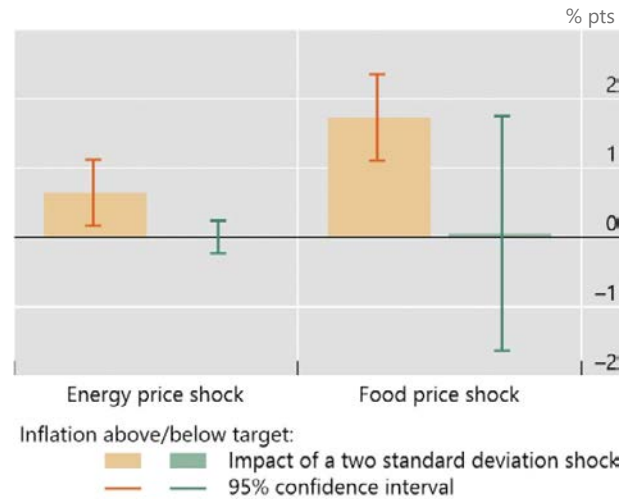
Transition to high-inflation regimes can emerge quickly once inflation is above target

Graph 4

A. Short-term inflation expectations jumped as high-inflation environment took hold¹



B. Commodity price shocks raise inflation expectations when inflation is high²



¹ Average of AU, CA, CH, DK, EA, GB, JP, NO, NZ, SE and US. Break-even inflation rate covers AU, CA, DE, FR, GB, SE and US. ² Estimates from an instrumental variable local projection model regression which regresses one-year-ahead inflation expectations on energy and food price inflation, instrumented by oil production supply shocks and harvest shocks, respectively. The estimates show the impact on one-year-ahead inflation expectations 12 months after the shock.

Sources: Consensus Economics; national data; BIS.

The BIS's two-regime view of inflation highlights how transitions from low- to high-inflation regimes are self-reinforcing.¹¹ When inflation is low, businesses and households neglect sector-specific price changes because they trust that the overall purchasing power of money will remain stable. However, once inflation rises, price changes suddenly move into sharp focus, when diverse groups of people experience similar losses of purchasing power because prices increase. As a result, inflation becomes a more relevant focal point for the decisions of businesses and households.

In such an environment, a commodity price shock, for example, could gain an outside influence on inflation dynamics given its impact on real wages and profit margins.¹² Recent BIS research shows that if inflation is already above the inflation target when adverse energy or food price shocks hit the economy, as was the case in early 2022, inflation expectations rise significantly (Graph 4.B, orange bars). By contrast, if inflation is below target, inflation expectations barely move (green bars).

¹¹ BIS (2022) and Borio et al (2023).

¹² See eg Coibion and Gorodnichenko (2015), Reis (2022) and Patzelt and Reis (2024).

This means that when households and businesses are already feeling the effects of inflation, central banks need to be especially vigilant in their monitoring of inflation and inflation expectations and their impact on price- and wage-setting dynamics.

Forceful monetary tightening can re-anchor inflation

The second lesson is that forceful monetary tightening can re-anchor inflation expectations and stabilise inflation in the wake of supply shocks. With the benefit of hindsight, some have argued that central banks in many advanced economies were slow to react to the initial burst of inflation, anticipating that they could look through it because it would be transitory.¹³ As monetary policy remained very accommodative during 2021, the post-pandemic inflation path closely mirrored the 1973 inflation surge (Graph 5.A). However, the interest rate trajectories then diverged.

To bring inflation back down and restore price stability, central banks reacted with the most globally synchronised cycle of monetary policy tightening in history. The extent and vigour of these reactions demonstrated central banks' resolve to quell the rise in inflation even at the risk of considerably raising the interest payments of indebted economic agents, including national treasuries, and sharply slowing economic activity. BIS analysis suggests that without this forceful tightening, inflation would have remained elevated (Graph 5.B). Actions, and not just words, counted in such circumstances.¹⁴

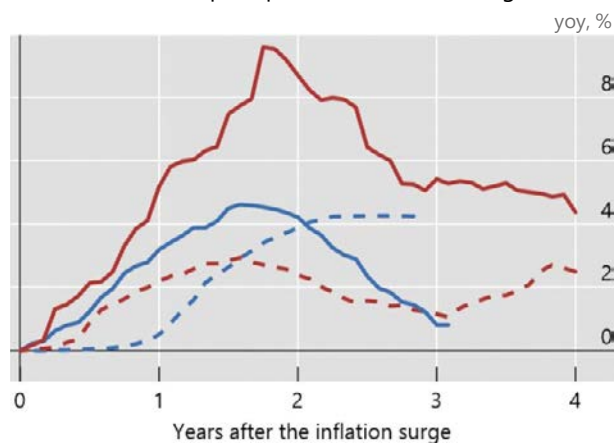
¹³ Note that many emerging market central banks reacted more quickly to the post-pandemic supply shocks, raising interest rates as soon as inflation started to emerge. For example, the central banks of Brazil and Mexico started increasing interest rates in March 2021, a full 12 months before the Federal Reserve and 18 months before the ECB. Less well anchored inflation expectations were one important reason for the more rapid monetary response by emerging market central banks.

¹⁴ See eg Bauer et al (2024).

The role of monetary policy in countering the inflation surge

Graph 5

A. The 1973 vs the post-pandemic inflation surge



Change since the beginning of the inflation surge in:
 1973: Core inflation (solid red line), Nominal policy rate (dashed red line)
 2021: Core inflation (solid blue line), Nominal policy rate (dashed blue line)

B. Inflation with and without monetary tightening¹



Core inflation: — Without monetary tightening (red line)
 — With monetary tightening (blue line)

¹ Simulations based on the semi-structural model by Hofmann et al (2021).

Sources: Amatyakul et al (2023); Global Financial Data; national data; BIS.

The Phillips curve can be non-linear

A third lesson from the post-pandemic inflation surge is that the Phillips curve, the relationship between unemployment (or, more broadly, economic activity) and inflation, can be non-linear. Under certain conditions the Phillips curve becomes steeper so that a given change in economic activity is associated with a larger change in inflation, or conversely, a given change in inflation is associated with a smaller change in output, as experienced during the recent post-Covid inflation episode.

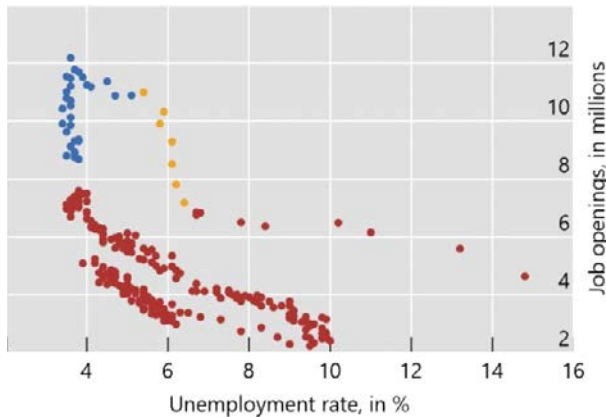
Instances of tight labour markets, where adjustments take place primarily through wages rather than employment, are one such case when Phillips curves steepen. During the post-pandemic recovery, many firms were looking to fill job vacancies when unemployment was already low. As a result, the unemployment rate barely changed even as the number of job openings soared, as shown here for the United States (Graph 6.A, yellow and blue dots). The Beveridge curve describing the relationship between job vacancies and the unemployment rate became essentially vertical. In such circumstances, as firms struggle to add additional production capacity, all shocks, including adverse supply shocks, translate much more strongly into changes in inflation than into changes in output.¹⁵

¹⁵ Benigno and Eggertsson (2023, 2024).

Tight labour markets and high price flexibility call for a stronger monetary policy response to supply shocks

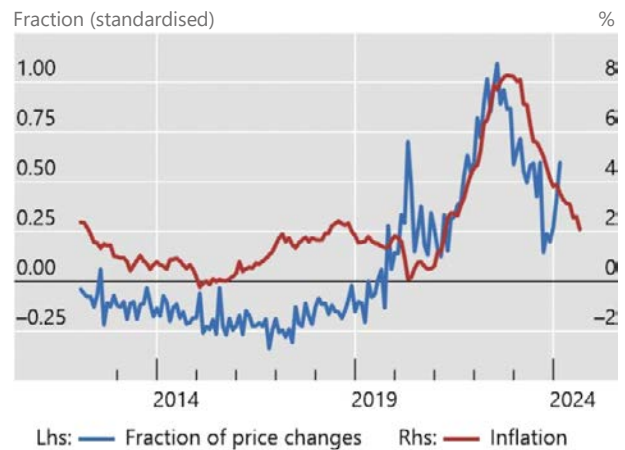
Graph 6

A. Tight labour markets during the post-pandemic inflation surge



US: ● From December 2000 to December 2020
 ● From January 2021 to July 2021
 ● From August 2021 to January 2024

B. Frequency of price changes jumped with higher inflation¹



Lhs: — Fraction of price changes Rhs: — Inflation

¹ Sample covers FR, SE and US. The inflation is computed as the average, and the frequency of price changes as the average of the standardised respective statistic: FR = companies that changed their price in per cent (seasonally adjusted); SE = frequency differences in percentage points; US = fraction of price changes.

Sources: Gautier et al (2023); Karadi et al (2024); Klein et al (2024); Montag and Villar (2023); Federal Reserve Bank of St Louis, FRED; BIS.

The Phillips curve is also steeper when prices become more flexible across the economy. During the post-pandemic inflation surge, prices adjusted much more frequently in many countries when increases in sectoral price shocks turned into broad-based inflation (Graph 6.B). This mechanism makes the slope of the Phillips curve that policymakers face shock-dependent. It is steep for large shocks when many firms adjust prices, such as during an inflation surge, and flat for small shocks when only few firms adjust.¹⁶ A recent BIS working paper shows that the optimal monetary policy response to larger inflationary supply shocks is more aggressive because it is exactly in those states that prices become more flexible and the Phillips curve is steeper.^{17, 18}

For monetary policy, a steeper Phillips curve implies that the output costs of leaning against inflation will be smaller (as illustrated earlier in Graph 3.B). This is good news for central banks, because it means that the reduction in output needed to bring down inflation could be smaller. However, it is important to stress that the resolve of central banks to maintain price stability in the face of supply headwinds should always prevail whether or not it implies output losses. If the

¹⁶ See Blanco et al (2024) and Cavallo et al (2023), who quantify this for the United Kingdom and euro area, respectively.

¹⁷ Karadi et al (2024).

Phillips curve were flat, central banks would still need to tame inflationary shocks even if it implied larger output losses.

Implications for the look-through approach to supply shocks

In sum, these lessons remind us that **central banks must exercise care** when assessing the extent to which they can afford to look through supply shocks. Being able to do so depends critically on containing the risk of transitioning to a high-inflation regime. For example, during the latest global inflation surge, the inflationary energy price shocks hit at a time when inflation was already in focus and supply capacity was limited due to the Covid-related supply disruptions. This greatly increased the risk of a transition to a high-inflation regime, forcing central banks to react.

Another implication is that raising policy interest rates in response to adverse supply shocks may have only limited effects on activity if Phillips curves are steep. Then, slowing the economy to tame inflation could be less costly in terms of output. Today's soft landing outlook may be partially explained by the economy, and in particular labour markets, being in a state where the Phillips curves are steeper than had been the case in the decades prior to the pandemic.

Supply challenges going forward – a new normal?

The lessons from the post-pandemic inflation surge will probably remain relevant going forward. Adverse supply shocks could become larger and more frequent. At the same time, structural headwinds could make supply less elastic, and hence shocks more inflation-prone. This will make it all the more important for central banks to maintain stable prices and thereby trust in the purchasing power of money.

Let me explain why I believe these risks should be taken seriously.

Risk of larger and more frequent adverse supply shocks

Supply shocks could become larger and more frequent for several reasons. Recent changes in geopolitical risks and trade tensions may prove to be persistent and could even have sudden large adverse impacts on energy and import prices.

Supply shocks could also come in new guises due to the green transition and climate change. Until green technologies reach sufficient scale, a bumpy transition from "brown" to "green" technologies, for example due to an underinvestment in brown technologies, could be a source of adverse supply shocks. Food prices could also become more volatile due to rising global temperatures and more frequent extreme weather events.¹⁹ We already had a small taste of this in 2022–23, when a combination of high temperatures and droughts in southern Europe, and

¹⁹ See Kotz et al (2024).

heavy rains in northern Europe, contributed to a food price spike. Both advanced and emerging market economies may be affected by these shocks.

All this means that inflation could become more volatile, raising the risk that economies transition more easily from self-stabilising low-inflation regimes to self-reinforcing high-inflation regimes.

Adverse supply shocks may also become more persistent and have long-lasting or even permanent effects on supply capacity. In fact, some of the shocks that occurred during the inflation surge have not fully reversed. Energy prices remain significantly above pre-pandemic levels in several countries, a development that is reminiscent of the oil price increases in the 1970s. Labour markets have also undergone major changes since the Covid pandemic, with an unclear long-term impact on productivity and supply. We therefore need to recall the lessons learned in that period, that monetary policy cannot shield the economy from supply shocks that durably lower potential output. Instead, the monetary policy stance must ensure that demand adjusts to reduced supply potential.

Less elastic supply as structural tailwinds turn into headwinds

In addition to the risk of larger and more frequent supply shocks, the supply side of the economy could now be less elastic due to structural supply headwinds, with changes in prices becoming the main adjustment mechanism.²⁰

Globalisation has slowed in recent years and is potentially already in retreat. For several decades, globalisation has helped ease domestic supply constraints by allowing economies to tap into an expanding global supply, preventing excess domestic demand turning into inflation. If deglobalisation trends take hold, they would weaken the scope for international trade to act as a shock absorber of domestic inflationary pressures.

Demographic tailwinds are now turning to headwinds in many major economies as well, especially in those that are not major net recipients of migration. As birth rates have plummeted in advanced economies over the past two decades, the working age population share has started to decline as the baby boomer generation – the largest cohort by far in many countries – enters retirement. In emerging market economies, it is no longer rising. The latter is important as globalisation helped advanced economies to tap into the positive demographic tailwinds in emerging market economies. As these demographic trends turn, workers' bargaining power might increase, potentially generating greater resistance to downward pressures on real wages or even bringing back indexation mechanisms and leading to wage-price spirals.²¹

High public debt levels may also indirectly weaken supply capacity by restraining investment and productivity growth. Today, governments face tough choices between supply-enhancing public

²⁰ Carstens (2022).

²¹ Lombardi et al (2020).

investment such as education and infrastructure and public expenditures for health, social security and defence.

Even new supply tailwinds such as artificial intelligence (AI) may make inflation more volatile. AI should increase the capacity to process and analyse information, if it enables businesses to dynamically tailor prices to demand and supply factors. More flexible prices would make Phillips curves steeper, increasing the sensitivity of inflation to demand and supply shocks, as discussed before.²²

Taken together, these evolutions in supply may turn out more inflation-prone (Graph 3.B). In such a world, keeping inflation expectations anchored becomes even more critical for the central bank goal of keeping inflation low and stable.

Implications for monetary policy principles and frameworks

Let me conclude.

Going forward, what are the implications of a world with more frequent episodes of adverse supply conditions for monetary policy?

First, a piece of good news: the core principles and frameworks of monetary policy stood the test of time. Maintaining price stability and keeping inflation expectations anchored remain the key tasks of central banks. Keeping prices stable means that households and businesses can make borrowing and spending decisions with more certainty, benefiting growth and employment. Central bank independence and inflation targeting frameworks have proven their worth in meeting this objective. They maintained price stability in the three decades before the pandemic and passed the test of the post-pandemic inflation surge. Their credibility enables central banks to look through transitory supply shocks, avoiding the costs associated with temporarily raising interest rates. But this is only possible as long as inflation expectations remain anchored.

Second, central banks will need to adapt to the risks of greater supply headwinds. The economic landscape may well be changing, featuring greater risk of adverse supply shocks and less elastic supply. This may require adjustments to the conduct of monetary policy in the face of more inflationary supply and demand shocks. Looking through supply shocks will not always be possible. At times, forceful monetary tightening will be needed to ensure that inflation expectations remain anchored. In this vein, we also need to be mindful that monetary policy cannot shield the economy from adverse supply shocks that lower potential output.

Third, this adaptation requires more analytical work to better understand the supply side of the economy.²³ Central banks will need to strengthen their analytical capabilities to better identify the nature of the shocks and potential risks of transitioning to a high-inflation regime. To

²² For a more in-depth analysis of AI's macroeconomic impact, see BIS (2024).

²³ See Romer (2016), calling for a more systematic analysis of the nature of shocks in economic models.



do so, they must be able to accurately assess the economy's ability to absorb adverse supply shocks. They must also identify shifts in key parameters that affect the way monetary policy is transmitted to the economy in the face of such shocks. Important areas of analysis include the changing nature of domestic and global supply capacity; evolving labour market dynamics; the frequency of price adjustments and, relatedly, the steepness of the Phillips curve; and the dynamics of inflation expectations.

Let me end with a plea to the students in the room: contribute to a deeper understanding of these issues that are so relevant for central banks. Good research on these topics will influence the ways central banks conduct monetary policy – and will therefore affect people's living conditions.

Strive to make a meaningful difference, guided by the knowledge that your contributions can lead to a more stable and prosperous society.

Thank you, and I look forward to seeing the positive impact you will make in the world of monetary policy and beyond.

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