



Wilfried
Martens Centre
for European Studies

Why Price Stability Matters

Jürgen Matthes, Michael Grömling, Markus Demary,

Björn Kauder, Berthold Busch, Gero Kunath and Thomas Obst



Credits

The Wilfried Martens Centre for European Studies is the political foundation and think tank of the European People's Party, dedicated to the promotion of Christian Democrat, conservative and like-minded political values.

Wilfried Martens Centre for European Studies
Rue du Commerce 20
Brussels, BE 1000

For more information please visit
www.martenscentre.eu

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About the Martens Centre



The Wilfried Martens Centre for European Studies, established in 2007, is the political foundation and think tank of the European People's Party (EPP). The Martens Centre embodies a pan-European mind-set, promoting Christian Democrat, conservative and like-minded political values. It serves as a framework for national political foundations linked to member parties of the EPP. It currently has 31 member foundations and 3 permanent guest foundations in 24 EU and non-EU countries. The Martens Centre takes part in the preparation of EPP programmes and policy documents. It organises seminars and training on EU policies and on the process of European integration.

The Martens Centre also contributes to formulating EU and national public policies. It produces research studies and books, electronic newsletters, policy briefs and the twice-yearly *European View* journal. Its research activities are divided into six clusters: party structures and EU institutions, economic and social policies, EU foreign policy, environment and energy, values and religion, and new societal challenges. Through its papers, conferences, authors' dinners and website, the Martens Centre offers a platform for discussion among experts, politicians, policymakers and the European public.

**About
the main
authors**



Jürgen Matthes heads the Research Unit for International Economics and Economic Outlook at the German Economic Institute (Institut der deutschen Wirtschaft, IW), the largest privately financed economic think tank in Germany. Before taking this position in 2015, he held several other positions at the IW, which he joined in 1995. His economic studies were undertaken in Dortmund and Dublin (1988–95). He has published on a wide range of topics covering European Monetary Union, trade policy, China, Brexit, protectionism, the competitiveness of nations and structural economic change.



Michael Grömling heads the Research Group on Business Cycle Analysis at the IW. Since 2003 he has been the editor of *IW-Trends*. Since March 2006 he has also worked as a professor of economics at the International University, Campus Cologne. His research focus lies in business-cycle analysis, long-term economic development, structural change and national accounting. Before starting work at the IW in 1996 he studied economics and completed his doctorate in economics at the University of Würzburg.



Markus Demary is a senior economist at the IW with extensive experience in the economic analysis of monetary policy and financial markets and their interaction with the business sector. He has worked in this area for more than 10 years. Prior to joining the IW, Markus worked as a research assistant at the University of Kiel, where he completed his doctorate in economics in 2010. Markus has been a lecturer in behavioural finance at Ulm University since 2011.

Executive summary



As of March 2023, overall inflation is declining in Europe. However, core inflation levels continue to remain well above the 2% mandate of the European Central Bank (ECB). In fact, the current bout of inflation should continue to weaken as and when supply-chain disruption and energy shortages abate. If prices should decline somewhat from their recent peak levels, their contribution to inflation would even be negative, that is, they would contribute to lower inflation rates.

However, there are also factors that will prevent a large and immediate decline in inflation as soon as these scarcities wane. As import and supply prices have risen very strongly in recent months, it will take some time for these price increases to feed through the value chains into the final consumption and consumer prices. This is an important reason why inflation will remain significantly higher than 2% for the next one to two years. However, after this period inflation should come down again to more normal levels, unless significant new price pressures or 'second-round effects' occur.

An important second-round effect would be a rise in inflation expectations among economic actors. This is why the ECB needs to continue to signal its commitment to getting inflation down to its target rate of 2% in the medium term. Another important second-round effect—one that is closely connected to inflation expectations—is the potential for a wage–price spiral. In fact, this represents the largest current danger as it could lead to high inflation becoming much more persistent. Import price increases (and particularly energy price shocks) must not be amplified by further labour cost shocks, but instead the resulting loss of purchasing power must be shared between employees (through lower real wages) and employers (through lower profits, as firms cannot usually fully pass on higher input costs in their sales prices).

If trade unions force significant labour cost increases to keep real wages constant or even rising, renewed cost shocks would lead to new price pressures for firms and force them to increase their sales prices further. This would most likely lead to a wage–price spiral and would force the ECB to raise interest rates even more, thus increasing the costs of disinflation and the danger of a recession.



To prevent a wage–price spiral, it is thus high time for macroeconomic coordination between the various policy actors. Monetary policy should focus on targeting price stability, while wage bargaining and fiscal policy should support monetary policy in this objective. Wage negotiation outcomes should include one-off payments by companies on top of normal wage increases. One-off payments would target purchasing power losses but would, at the same time, prevent a long-term increase in labour costs. Fiscal policy should make one-off payments attractive for companies and employees by allowing generous tax deduction possibilities. Even more important, fiscal policy should strive to limit the impact of the current large price increases by providing targeted income support for those members of society most negatively affected by higher inflation rates. In any case, due to high inflation rates and actual supply-side constraints, it is currently not the time for a fiscal stimulus via higher government expenditures.



Introduction



Inflation is back and might not retreat soon. The coronavirus crisis led to supply-side blockages and excess demand in certain areas at the same time. The former contributed to serious disruptions of supply chains and worldwide logistics. An open question is whether the surprisingly high and persistent price increases will play out as only a temporary spell of inflation or whether we will have to cope with generally higher inflation in the longer term. Should inflation remain significantly elevated for an extended period, this will have detrimental effects on the economic model, on growth and on social outcomes in the EU. The negative repercussions of inflation should not be underestimated.

Against this background, this study explains why inflation might stay more elevated than expected (Section 1). Aside from current energy price trends and possible wage–price spirals in European countries, this will depend on the effect on inflation of the key trends of this decade: decarbonisation, digitalisation, demography and deglobalisation. This medium-term perspective is often neglected in the current debate.

The main part of this study deals with the detrimental effects of inflation on economic and social outcomes (Section 2). It draws on the main insights from diverse literature and points out the main channels through which inflation exerts its negative effects. Experiences of past inflation phases are also highlighted for illustrative purposes. This also pertains to property prices, which have risen sharply in many European countries but are not measured sufficiently in official price statistics, despite the fact that it has become more difficult for younger generations to afford to buy property.

Inflation will also affect public debt sustainability. The influences on the public debt level and the public debt-to-GDP ratio are manifold. The main channels are explained and illustrated by simulations of several inflation scenarios for selected large and highly indebted European countries (Section 3).

To curb inflation pressures and regain price stability, as a key ingredient of the European economic model, the course of European economic policy needs to be grounded in a sound and reliable stability orientation (Section 4).



Why inflation is back and might stay elevated

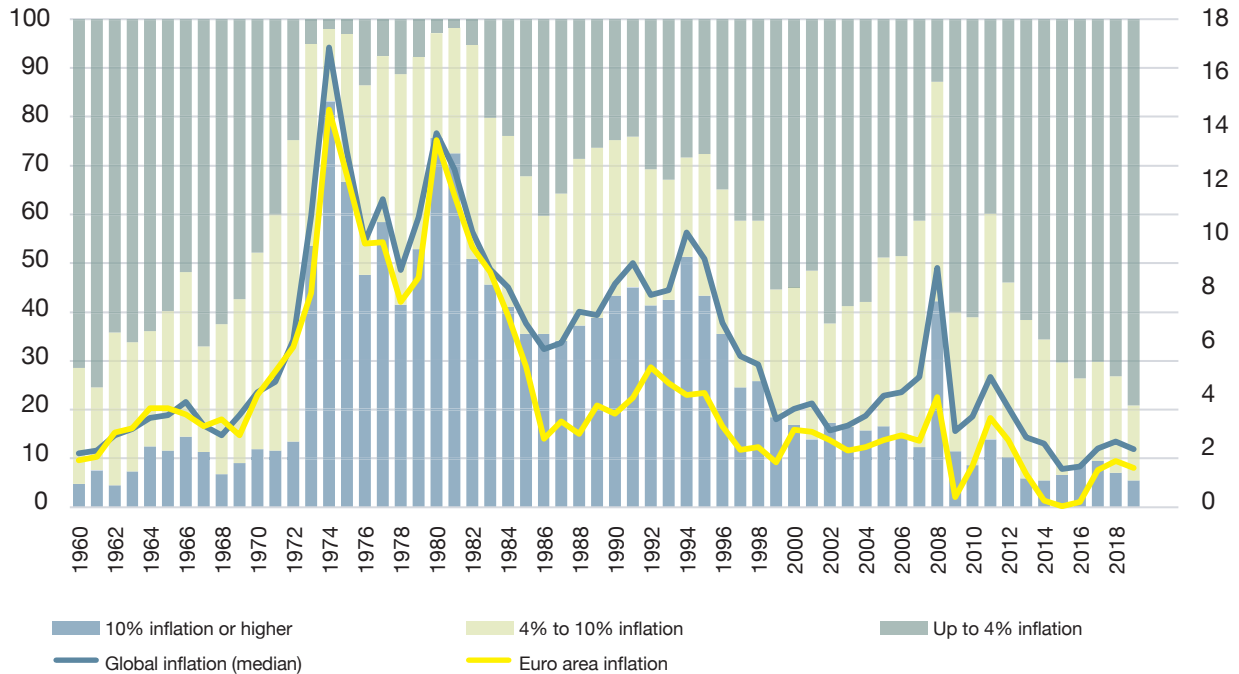
1.1 Inflation in a longer-term perspective

To put the current relatively rapid price increases into context, a brief overview of long-term inflation developments is provided. It illustrates that inflation in the EU has risen to much higher levels than in the last four decades. However, inflation was even higher in Europe and worldwide after the two oil price crises of the 1970s. Looking at European and global inflation since 1960, the years 1974 and 1980 saw peak inflation rates—with inflation in the EU at around 13%. In 1974, the global median inflation rate was at close to 17% per year and 83% of all countries experienced double-digit inflation (Figure 1.1).

Restrictive monetary policies during the early 1980s lowered inflation significantly while pushing many economies into recession. After price increases picked up moderately in the late 1980s and early 1990s, inflation continued to trend downwards for about a decade. A global economic boom, the rise of China and, as a result, rapidly increasing raw materials prices led to sharp but temporary inflation peaks after 2005, which peaked just before the global financial crisis, with euro area inflation topping out at 4.1% and a global median inflation rate of nearly 9%. After that, inflation trended downwards again with some fluctuations. In the context of the euro debt crisis and its aftermath, at some points there were even fears of deflation.



Figure 1.1 Global median inflation rate and euro area inflation, year-on-year in % (right scale); share of 200 countries with low, medium and high inflation in % (left scale)



Sources: World Bank; German Economic Institute (IW).

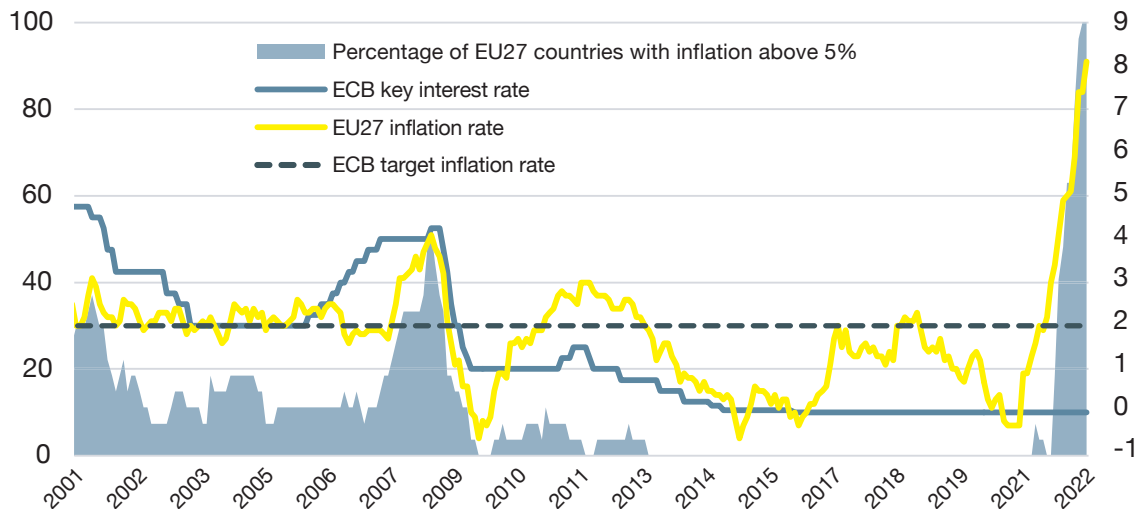
In 2019, before the Covid-19 pandemic, the global median inflation rate was 2.1% and thereby in line with most central banks' inflation targets. More than 80% of all countries were experiencing an inflation rate of less than 4% and only 5.5% of all countries had a double-digit inflation rate (Figure 1.1).



1.2 Current inflation situation

The Covid-19 outbreak and subsequent lockdowns in 2020 reduced inflation for a short period as global demand and economic confidence initially declined. However, governments resorted to expansive fiscal policy to tackle the economic downturn of the pandemic, and private demand soon started to recover. For instance, the US government spent an astounding 25% of GDP to help companies and households.¹ At the beginning of 2021 further lockdowns and ongoing global supply-chain disruptions led to shortages of goods pushing up prices. In addition, rising energy and food prices amplified price pressures. Even though many economists expected these trends to be temporary, they proved to be more persistent. Moreover, the Russian invasion of Ukraine further aggravated these trends and led to inflation rates of more than 8% in Europe in the spring of 2022—levels last seen about four decades ago (Figures 1.1 and 1.2).

Figure 1.2 Share of EU27 countries with inflation over 5% (left scale); average inflation in EU27 and target inflation rate of the ECB (right scale)



Sources: Eurostat, European Central Bank; German Economic Institute (IW).

Note: Euro area inflation rate closely follows EU27 inflation rate.

¹ M. Hütter and T. Obst, 'Phillipskurve und fiskalische Dominanz der Geldpolitik – Was treibt die Inflation?', IW, Brief no. 57 (Cologne, 2022), 3.



Most economists forecast a gradual normalisation of price increases in 2023 and 2024, mainly because they do not expect the currently extraordinary energy and food price increases to continue. These forecasts depend not only on further developments in energy prices and global supply-chain disruptions, but also on possible wage–price spirals and the development of inflation expectations. Trade unions are indeed becoming increasingly wary about the diminishing purchasing power of workers. Similar to the 1970s, they are demanding higher nominal wages. This would increase labour costs for companies which might then be passed on to consumers, thus triggering a spiral that could lead to a further economic slowdown (Section 4). The ECB, however, will have to fight such a wage–price spiral to achieve the target of price stability.

1.3 Factors driving inflation in the next 5 to 10 years

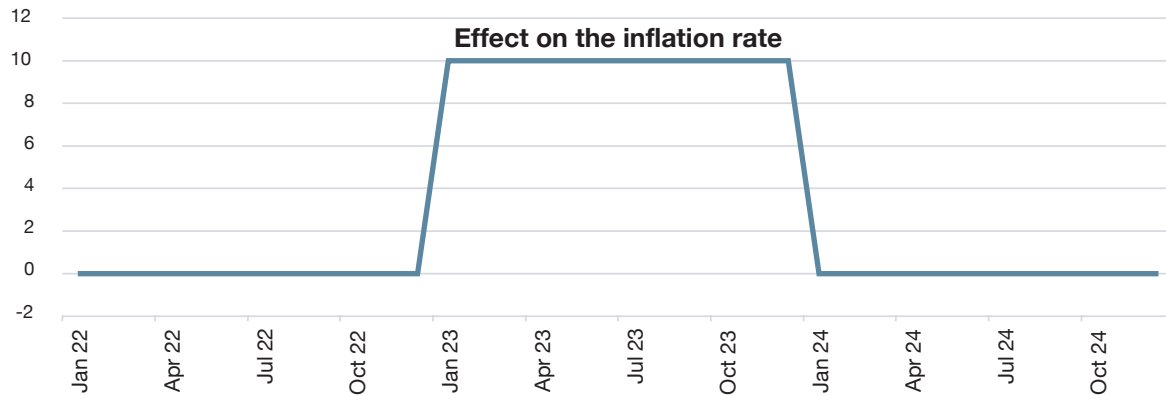
Apart from the above-mentioned short-term inflation trends, there are also medium-term trends. Among the factors that will shape inflationary developments in the next 5 to 10 years are demographics, digitalisation, deglobalisation and decarbonisation. These megatrends will influence growth and economic well-being,² but also inflation.³ These impacts will be analysed in a qualitative manner.

Figure 1.3 Effect of a one-off, permanent increase of the price level by 10% in January 2023 on inflation rates (monthly change of the price level against previous year in %) in 2023 and 2024



² M. Demary, A.-L. Herforth and J. Zdrzalek, *The New Inflationary Environment: How Persistent Are the Current Inflationary Dynamics and How Is Monetary Policy Expected to Respond?*, IW, Report no. 16 (Cologne, 2022).

³ H. Bardt et al., *Lieferengpässe und Preisentwicklung bei Rohstoffen und Vorleistungen. Corona Echo Effekte oder 'Here to Stay'?*, IW, Report no. 27 (Cologne, 2021).



Source: German Economic Institute (IW).

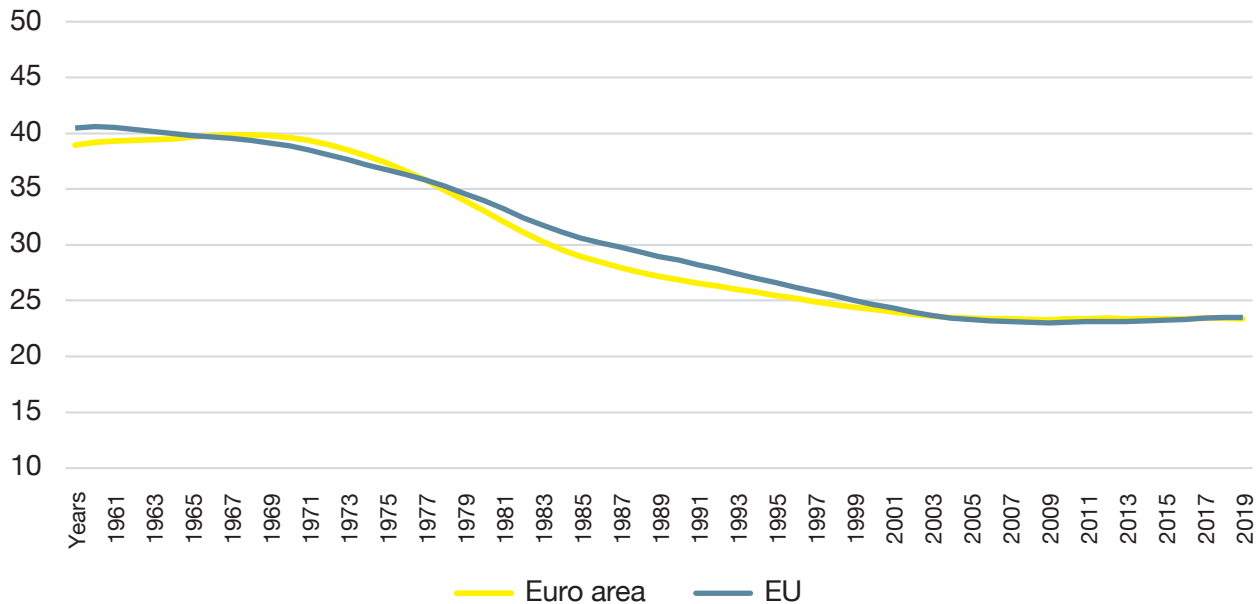
In this analysis, it is important to distinguish between effects on the price level and effects on the inflation rate (the change in the price level against the previous year), and also between one-off and permanent effects (Figure 1.3). For example, deglobalisation—that is, a reduction in economic integration—tends to increase the price level (Section 1.3.2). This might have a one-off effect on the price level, which will remain permanently higher, but will increase inflation rates only in the year when the negative impacts of economic disintegration become effective. Only if the shrinking of economic integration continues year on year will the price level continually increase and the inflation rate remain higher year on year. However, if the reduction in economic integration does not continue, the price level will remain stable and the inflation rate will not be higher in this year, but fall back, as the price level is not increasing further (Figure 1.3).

1.3.1 Demographics and the exit of baby boomers from the labour market

Demographic trends are likely to lead to increasing inflation rates in the medium term. The effects of demographics on inflation are transmitted mainly via labour and skills shortages on the labour market, which lead to higher labour costs and cost-induced price increases. Labour shortages can be caused by demographic trends, such as when the working-age population shrinks, which mainly depends on the balance between the number of older employees retiring and the number of younger people entering the labour market.



Figure 1.4 Young–age dependency ratio: number of people under 15 years old relative to number of people aged 15 to 64 years, in %



Sources: World Bank; German Economic Institute (IW).

A clearly foreseeable key trend is the retirement of the large cohorts of baby boomers, who were born between the late 1950s and the broader introduction of the contraceptive pill in the late 1960s. In Germany, for example, about five million people of working age will leave the labour market between 2025 and 2035.⁴ Moreover, the absolute size of younger generations is considerably smaller as birth rates have declined over time. This can be seen from the changes in the young–age dependency ratio in Europe (Figure 1.4).

⁴ M. Grömling, 'Ein Wachstumspfad für mehr Produktivität, Innovation und Beschäftigung in Deutschland', Opinion (Cologne, 11 November 2021).



The young–age dependency ratio measures the number of young people under 15 years old, who are not yet part of the labour force, relative to the working-age population aged 15 to 64 years. While a high ratio suggests that many young workers will enter the labour force in the future, a declining ratio indicates upcoming labour shortages in the medium term, as children aged five, for example, will only enter the labour market in about 10 to 20 years, depending on their time spent in education. Due to the baby boom, in the 1960s the young–age dependency ratios for the euro area and the EU stood at around 40%. These ratios have decreased ever since, reaching around 23% in the year 2020. Given the low birth rates in European countries, these trends are likely to continue.⁵

Factors that ease this situation, such as the immigration of young, qualified workers, are unlikely to be able to compensate for these downward trends. While many EU countries have introduced labour-migration policies targeted at a narrow range of high-skilled shortage occupations, these policies tend to neglect the broad range of labour shortages from low-skilled to high-skilled occupations.⁶

This interplay between the looming shortfall of young workers and the pending exit of large numbers of workers from the labour force will create labour shortages in European labour markets in the near future.⁷ This development is hitting EU labour markets, which have already become tighter since the Covid-19 outbreak, with the unemployment rate lower than at the outset of the pandemic and vacancy rates considerably higher (Figure 1.5). Moreover, labour shortages are likely to be particularly severe in certain skills groups such as technical professionals.

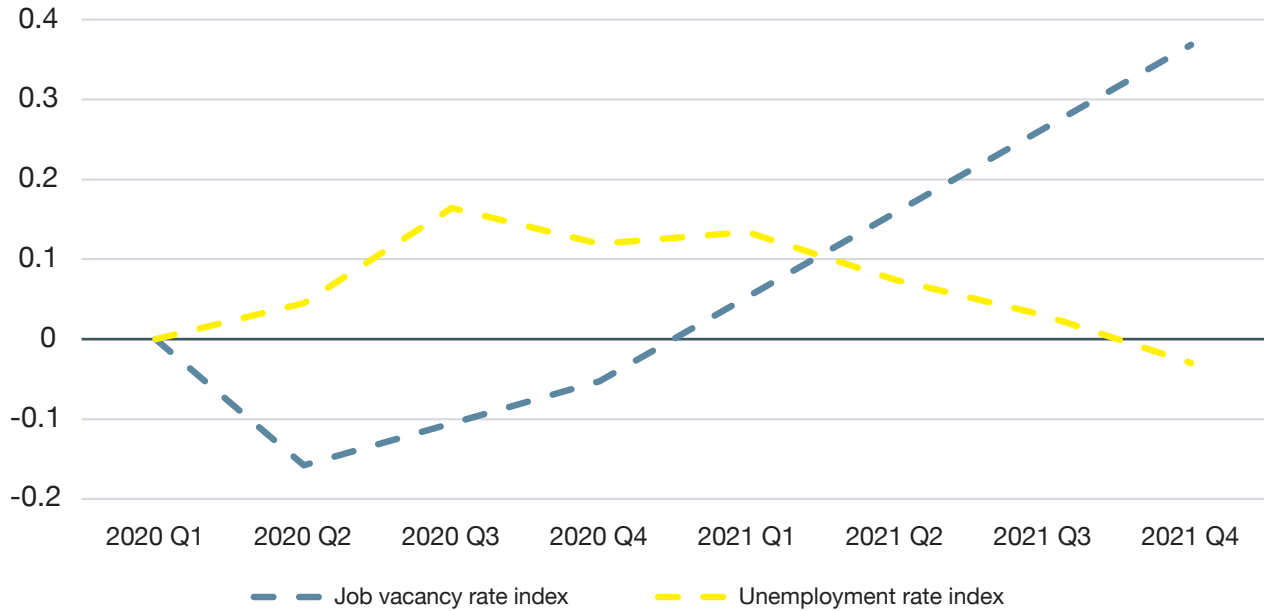
⁵ Eurostat, 'Population Structure and Ageing' (2022).

⁶ European Commission, *Determining Labour Shortages and the Need for Labour Migration from Third Countries in the EU*, Synthesis Report for the EMN Focused Study (2015).

⁷ Cedefop, 'Baby Boomers Retiring in the Wake of the Pandemic', 15 June 2020.



Figure 1.5 Labour market tightness in the EU



Sources: Eurostat; German Economic Institute (IW).

Note: Index: 2020 Q1 = 0.

A key question is whether pending labour shortages will lead to temporary or permanent effects on inflation rates in the medium term due to permanently higher increases of wage and labour costs. A clear argument can be made for permanent effects because increasingly tighter labour markets in the future are likely to lead to a permanent increase in the bargaining power of employees and trade unions.



However, there is a mitigating factor to be taken into account. In principle, companies could try to lessen the bargaining power of their workers by reducing the labour intensity and raising the capital intensity of their production processes, that is, by replacing employees with machines. One can see examples in the emergence of restaurants with self-service and digital ordering tools, and in supermarkets in which customers can use the scanners of cash registers and pay digitally without the need for a cashier. Automation can reduce the demand of companies for low-skilled workers in the service sectors, but it can also increase the need for high-skilled workers to maintain these digital tools and services.⁸ This could even exacerbate the skills shortage (and the wage pressures) among high-skilled employees.

In sum, demographically induced labour and skills shortages are expected to create higher wage and labour cost pressures in the medium term. There are additional effects that could increase inflation, as higher wages tend to raise consumer demand and could thus also feed into permanently higher price increases. However, high inflation could erode the purchasing power of nominal wages and reduce this effect over time, depending on the development of real wages.

Another potential effect of demographics on inflation depends on the age structure of the population and results from the fact that different age groups have significantly different consumer spending patterns. A key question is whether the ageing of European societies will contribute to inflation as the group of non-working older people will increase relative to the working-age population. However, empirical studies have found ambiguous results for the effect of demographics on inflation.⁹ Some hint at a negative relationship between the non-working age population (dependents) and inflation,¹⁰ while others find a positive relationship. One of the suggested mechanisms behind a positive relationship presumes that old (and young) dependents consume but do not produce, so that demand increases relatively more than supply—ultimately feeding into inflation rates.¹¹

⁸ D. H. Autor, F. Levy and R. J. Murnane, 'The Skill Content of Recent Technological Change: An Empirical Exploration', *The Quarterly Journal of Economics* 118/4 (2003), 1279–1333.

⁹ E. Bobeica et al., *Demographics and Inflation*, ECB, Working Paper Series no. 2006 (Frankfurt am Main, January 2017); C. A. E. Goodhart and M. Pradhan, *The Great Demographic Reversal: Ageing Societies, Waning Inequality, and an Inflation Revival*, The European Money and Finance Forum, Policy Note no. 197 (2020); O. Rehn, 'Will Inflation Make a Comeback as Populations Age?', *VoxEU.org*, 13 January 2021.

¹⁰ Bobeica et al., *Demographics and Inflation*.

¹¹ Goodhart and Pradhan, *The Great Demographic Reversal*.



1.3.2 Deglobalisation, geopolitical tensions and strategic autonomy

Globalisation has contributed to lower prices and also to lower inflation rates over recent decades.¹² It is important to understand that globalisation implies a process of deepening economic integration. As long as this process continues, inflation rates tend to be lower. Thus, the inflation effect depends on the direction and speed of economic integration. In particular, stagnating integration would not influence inflation and deglobalisation could even increase inflation rates as it eliminates the price decreases that deeper economic integration creates. These considerations have to be accounted for when looking at the several channels through which globalisation has tended to reduce prices and inflation rates.

Globalisation is facilitated by a reduction of trade barriers as well as lower transport and communication costs. Imports of cheaper foreign goods reduce the cost of living. As long as the relevance of these imports for domestic demand increases, inflation rates are lowered. Moreover, globalisation increases competition, so that domestic companies facing more international competitors find it more difficult to raise prices. In addition, internationalisation and higher competitive pressures induce a reallocation of production factors towards more efficient firms with potentially higher rates of productivity growth. These are lasting structural effects which tend to reduce inflation rates permanently and which are stronger if the intensity of international competition is higher.

An additional price-reducing effect of globalisation concerns the exploitation of economies of scale. If firms can serve a larger customer base by entering new foreign markets, higher production volumes lead to lower unit production costs, which in turn tend to reduce the sales prices of these firms in competitive markets. As long as unit production costs decrease further by entering ever new markets, inflation rates will also remain lower. If, however, markets do not expand further, the cost level will remain lower, but inflation rates will no longer be affected.

¹² K. Rogoff, 'Globalization and Global Disinflation', *Economic Review Federal Reserve Bank of Kansas City* 88/4 (2003), 45–80; N. Pain, I. Koske and M. Sollie, 'Globalisation and OECD Consumer Price Inflation', *OECD Economic Studies* 44/1 (2008); M. G. Attinasi and M. Balatti, 'Globalisation and Its Implication for Inflation in Advanced Economies', ECB, *Economic Bulletin* no. 4 (Frankfurt am Main, 2021); M. Balatti et al., 'Globalisation and Inflation: Insights from the ECB Strategy Review', *VoxEU.org*, 11 October 2021.



All these price-reducing effects had already lost dynamism in recent years as the speed of globalisation largely proved exhausted.¹³ A growing trend towards protectionism since the global financial crisis has contributed to this development.¹⁴

A similar development can be noted in offshoring. Offshoring and the international division of labour enabled companies to relocate parts of their production to economies with significantly lower labour costs, such as Eastern Europe and Asia. This enabled cost savings and lower prices in industrialised economies. As long as more production was offshored, inflation was reduced. However, the offshoring process mainly happened between the 1990s and the global financial crisis, and has lost momentum and even stalled since.¹⁵ Thus, in recent years inflation rates have no longer benefited from further cost savings and the resulting price decreases.

While the price-reducing effects of globalisation had already become considerably weaker in the years leading up to 2019, the coronavirus crisis, rising geopolitical tensions and particularly the Russo-Ukraine war are likely to contribute to less globalisation and higher prices in the coming years.

- The coronavirus crisis led to lockdowns and shifts in demand which severely affected global supply chains, causing shortages and price increases, not only of semiconductors but also of many other goods. Moreover, transport costs rose significantly, mainly due to container shortages. While price increases and market reactions will over time contribute to a better match between supply and demand, the risk of further lockdowns remains, should new more lethal virus variants appear.
- The supply-chain shortages as a result of the coronavirus crisis, and also of the Russo-Ukraine war have revealed the vulnerability of global supply chains, which were focused on cost and time efficiency. Companies are likely to strive for a better balance between cost efficiency and the reliability of their supply chains, for example by means of diversification and holding larger inventories. This would lead to permanently higher costs and prices, and during the transition period also to temporarily higher inflation rates. The cost increases will be all the greater, the more costly the new suppliers are relative

¹³ M. Hüther, M. Diermeier and H. Goecke, *Erschöpft durch die Pandemie: Was bleibt von der Globalisierung?* (Wiesbaden, 2021).

¹⁴ *Global Trade Alert*, 'Total Number of Implemented Interventions Since November 2008' (2022).

¹⁵ M. Fritsch and J. Matthes, 'Factory Europe and Its Ties in Global Value Chains', Opinion, *Bertelsmann Stiftung* (2017).



to the old ones. Diversifying away from China would be one example, as China tends to subsidise domestic production on a large and broad scale which leads to particularly low production costs (and competitive distortions). Moreover, if production is reshored from low-wage countries to high-wage countries in the EU or elsewhere, the cost increases will be significant. This is likely for certain critical goods where a high dependency on untrustworthy partner countries is geopolitically problematic in terms of European strategic autonomy and potentially also national security.

- The dependency on Russian energy, and particularly on Russian gas, is a prime example. In the past, many European countries relied on Russian oil and gas. In the course of climate-change mitigation, some countries even further increased their dependency on Russia in the expectation that the Cold War rivalries between the West and the East had ended for good. The Russian invasion of Ukraine has terminated this mindset and will bring to a close the era of reliance on Russian energy imports. The reorientation of Europe towards much more expensive alternatives (especially liquid natural gas) will increase energy costs permanently. The effect on inflation rates will only be temporary if prices remain elevated but do not rise further in the future. Should energy prices decline somewhat after a transition phase, this would have a one-off and moderate dampening effect on future inflation rates.

In sum, several inflation-reducing effects of globalisation are expected to reverse in the medium term, as nationalism, protectionism, decoupling tendencies and reshoring intentions spread to make supply chains more reliable and to decrease one-sided strategic dependencies. This will contribute to higher inflation rates during the transition period and to a lesser extent permanently too, for instance, if the intensity of competition is reduced.

1.3.3 Decarbonisation and climate change

Decarbonisation and climate change are also expected to contribute to higher inflationary pressure in the medium term.

A key building block of European decarbonisation policy is the introduction of a price for the emission of CO₂ and the continual increase of this price in the coming years. This price should internalise the costs of CO₂ emissions to society and introduce incentives to avoid emissions and to invest in emissions-reducing technologies. Higher CO₂ prices will increase the cost of living as long as households do not reduce



CO₂ emissions, for instance, by shifting to climate-neutral heating systems and vehicles. A simulation for Germany¹⁶ shows that with the introduction of the CO₂ price in 2021 (nearly a 0.2 percentage point increase in the cost of living) the impact on the cost of living was sizeable, but it will be smaller for the envisaged further stepwise increases of the CO₂ price in the future. Moreover, it can be expected that households will change their behaviours in the coming years, which will lessen the impact on the cost of living and on the inflation rate.

Decarbonisation has a second effect on inflation, which is sometimes labelled ‘greenflation’. The vast volumes of investment in the decarbonisation of the global capital stock will increase global demand for related investment goods and particularly for the necessary raw materials, some of which are in short supply. The rising prices of these goods will lead to costs driving inflation during the decarbonisation phase.¹⁷

Not only decarbonisation, but also climate change per se will cause additional price pressures due to adverse weather events and catastrophes.¹⁸ Insurance statistics show a clear trend towards more impairments and catastrophes, most of them affecting food production. In the 1980s there were between 200 and 300 catastrophes worldwide per year. This number has increased to more than 800 per year more recently (Figure 1.6). The increase in severe adverse weather events due to climate change will likely create temporary inflationary pressures for years to come. Climate disasters can affect logistics and hence raise transport costs where the logistics infrastructure is affected. If regions critical to food supplies are hit by adverse weather conditions such as droughts or floods, food prices might surge temporarily. Moreover, a higher risk of climate change–related catastrophes increases the costs for companies, for example, through higher insurance premiums and higher financing costs. The number of rating downgrades because of environmental and climate events is expected to increase in future years.¹⁹

In sum, not only decarbonisation, but also climate change itself will contribute to a rise in inflation rates in the coming years.

¹⁶ Demary, Herforth and Zdrzalek, *The New Inflationary Environment*.

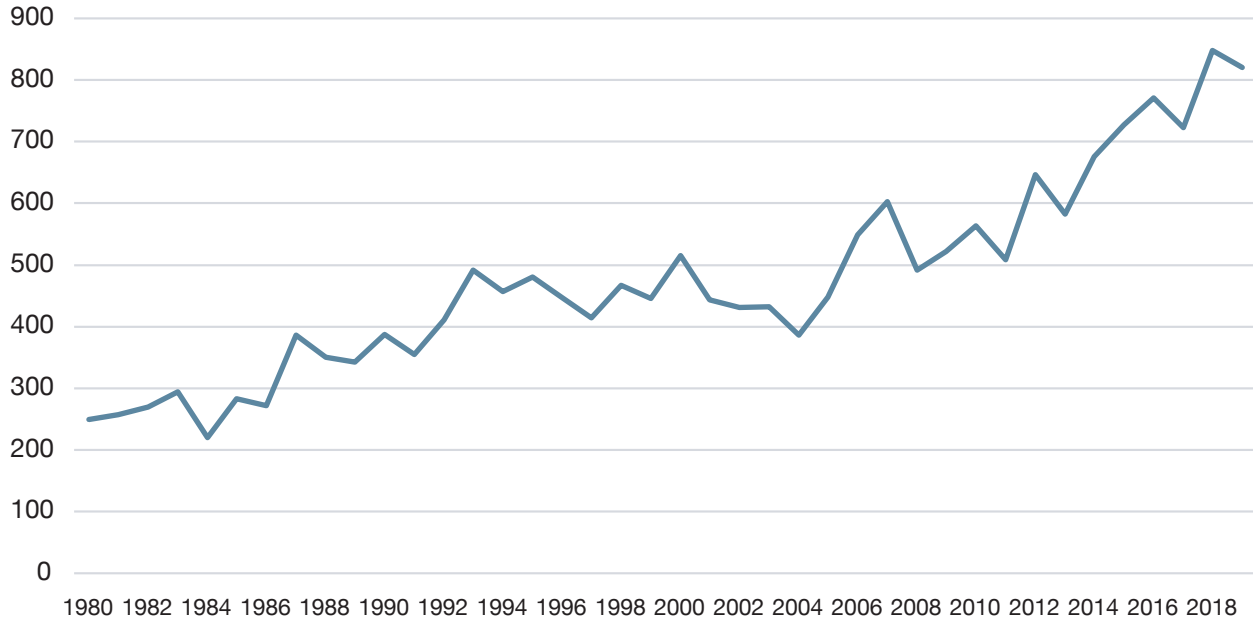
¹⁷ I. Schnabel, ‘A New Age of Energy Inflation: Climateflation, Fossilflation and Greenflation’, speech at a panel on ‘Monetary Policy and Climate Change’ at the ECB and its Watchers XXII Conference, Frankfurt am Main, 17 March 2022.

¹⁸ Ibid.

¹⁹ *FitchRatings*, ‘Climate Physical Risks to Sovereigns Growing’ (23 November 2021).



Figure 1.6 Numbers of catastrophes per year due to climate change



Sources: Munich Re; German Economic Institute (IW).

1.3.4 Digitalisation

The rapid diffusion of information and communication technology (ICT) and the emergence of digital goods and services have directly and indirectly contributed to lower inflation in the past.²⁰ However, the effect of digitalisation on inflation rates in the future is less clear. This will be illustrated in the following by considering the main channels through which digitalisation may affect consumer prices.

²⁰ J. Weidmann, 'Higher Growth, Lower Inflation? – Digitalisation From a Central Bank's Perspective', speech at the annual meeting of the German Economic Association, Freiburg im Breisgau, 3 September 2018; ECB, *Digitalisation: Channels, Impacts and Implications for Monetary Policy in the Euro Area*, Occasional Paper Series no. 266 (Frankfurt am Main, September 2021); G. Koester et al., *Understanding Low Inflation in the Euro Area From 2013 to 2019: Cyclical and Structural Drivers*, ECB, Occasional Paper Series no. 280 (Frankfurt am Main, September 2021).



First, digitalisation has already had a direct effect on consumer price inflation. Over the last two decades, usage of ICT, such as the Internet and smartphones, has radically increased. In 2007, 53% of households in the EU had Internet access. By 2021 this number had risen to 92%. The share of individuals using a portable computer or handheld digital device increased from roughly 50% in 2014 to around 75% in 2019.²¹ ICT has hence been used increasingly by households—making private transactions and activities more efficient in terms of time and expense. At the same time, ICT has become increasingly powerful. With the development of the first iPhone by Apple, one device was able to combine a computer, a telephone, a camera, and devices for listening to music and watching videos. Modern mobile apps allow smartphones to be used as document scanners and navigation devices. Thus, ICT has made a lot of goods in the consumer basket redundant for many people. Even though absolute ICT prices have risen, quality-adjusted ICT prices have fallen substantially. Estimates of the net effect of these developments suggest that the increasing usage and the decreasing price of ICT have reduced inflation in the euro area by 0.15 percentage points per year over the past two decades.²²

Second, companies' use of digital goods and services and ICT-related automation have enabled efficiency gains that have lowered companies' operational costs, producer prices and thus inflation rates (based on consumer prices). Company-level evidence hints at substantial increases in total factor productivity of 17% stemming from the employment of ICT specialists and digital technologies.²³ In the light of decreasing total factor productivity in numerous advanced economies during the last decades, this appears puzzling and is a reminder of the 'Solow paradox' of the late 1980s ('You can see the computer age everywhere but in the productivity statistics').²⁴ Given the positive productivity effects at the company level, the measured decline in productivity at the aggregate level could be expected to be even worse in the absence of digitalisation.

Third, digitalisation has had more ambiguous indirect effects on inflation rates, transmitted via market structures and competition:

- On the one hand, several effects have likely lowered inflationary pressures. The Internet has reduced market entry barriers and enabled firms to access consumers and markets that were out of

²¹ Eurostat, 'Digital Economy and Society Statistics – Households and Individuals' (2021).

²² ECB, *Digitalisation*.

²³ G. Cette, S. Nevoux and L. Py, *The Impact of ICTs and Digitalization on Productivity and Labor Share: Evidence from French Firms*, Banque de France, Working Paper no. 785 (2020).

²⁴ R. M. Solow, 'We'd Better Watch Out', 12 July 1987.



reach previously—thus allowing for higher production volumes and lower unit production costs by exploiting economies of scale. Moreover, Internet portals that facilitate price and quality comparisons have enabled greater transparency and thus increased competition. As consumers are better able to choose the best offer, the most efficient firms are favoured.

- On the other hand, digitalisation has enabled the rise of ‘superstar’ firms, such as Facebook and Apple, which have considerable market power. This market power could be used to impose non-competitive prices that heighten inflationary pressures.²⁵ It should be noted, however, that this development would mainly affect digital markets. It is not expected to offset the broader gains from competition realised by digitalisation.

In sum, digitalisation has tended to reduce inflationary pressures in the past. It is less clear how this will play out in the future. The impact of established ICT devices and uses such as the Internet or smartphones is expected to fade over the coming years. The price decreases will remain, but it does not appear very likely that a further significant reduction of inflation will result. However, the advent of artificial intelligence, cloud computing and other innovations such as the Internet of Things (Industry 4.0) are theoretically expected to significantly boost productivity for years to come. Whether these effects will create disinflationary pressures in the medium term depends on the materialisation of these expectations and correct measurement of the resulting effects. Institutional support for this transformation process will be decisive to fully reap the economic benefits. The framework ‘Shaping Europe’s Digital Future’ that was launched by the European Commission in 2020 provides a solid foundation in this regard.

1.4 Interim conclusion

In summary, three of the four analysed megatrends of the current decade are likely to increase inflationary pressures (Table 1.1). Only digitalisation has the potential to reduce them, but it is not entirely clear whether this potential will be realised. A quantitative net effect of the four trends cannot be derived from this qualitative analysis. However, if wage–price spirals should materialise on top of demographically induced labour shortages, and if deglobalisation and reshoring tendencies gain ground on a broader scale, higher inflation rates in the medium term appear likely.

²⁵ K. Charbonneau et al., ‘Digitalization and Inflation: A Review of the Literature’, Bank of Canada, Staff Analytical Note (2017).



Table 1.1 Main price effects of global megatrends

		Effects on prices and inflation rate	
		Increasing	Decreasing
Demographics	<ul style="list-style-type: none">• Scarcity of labour mainly due to retirement of baby boomers > higher bargaining power of employees and higher labour cost increases		
Deglobalisation/geopolitics	<ul style="list-style-type: none">• Less competition• Smaller markets and fewer economies of scale• Less division of labour/lower productivity		
Decarbonisation	<ul style="list-style-type: none">• Pricing CO2 emissions• Investments for transformation• Costs of climate catastrophes		
Digitalisation	<ul style="list-style-type: none">• Less competition due to superstar firms		<ul style="list-style-type: none">• More competition due to fewer entry barriers and more price transparency• Innovations/productivity

Source: German Economic Institute (IW).



Detrimental effects of high inflation

Inflation has a variety of problematic economic effects on a society. First and foremost, it negatively affects the purchasing power of people's incomes and of their financial wealth. In addition, there are problematic allocation and distributional effects, which are particularly to the detriment of more vulnerable societal groups. Moreover, the price competitiveness of companies in a country is also often impaired by high inflation, possibly leading to macroeconomic imbalances such as current account deficits and rising foreign debts. In addition, high inflation rates can have a wide range of problematic effects on the economy due to their tax implications. Last but not least, there is a contentious debate about the impact of inflation on employment and thus on economic activity and growth. These inflation effects should by no means be viewed in isolation; on the contrary, they can also interact with and reinforce each other. For the following overview of the possible negative effects of high inflation rates, extensive use was made of a number of economics textbooks and survey articles.²⁶

To understand the consequences of inflation via its multiple transmission channels, it is important to point out the distinction between anticipated and unanticipated inflation.²⁷ In the case of anticipated inflation, the individual economic agents of an economy have a well-founded idea or expectation of the extent to which prices will rise in a given period. Accordingly, they can adjust their decisions to these price changes and incorporate them into their actions. This does not mean that inflation will not entail adjustment costs. However, these costs are significantly higher in the case of unanticipated inflation. In fact, a period of high inflation can occur completely unexpectedly for economic agents. The price increases associated with the Covid-19 pandemic and the Russian war in Ukraine can be cited as examples of such 'surprise inflation'. Another form of unanticipated inflation concerns highly volatile inflation rates that cannot be sufficiently

²⁶ For example, E.-M. Claassen, 'Inflationseffekte', in A. Woll (ed.), *Inflation: Definitionen, Ursachen, Wirkungen und Bekämpfungsmöglichkeiten* (Munich: Vahlen, 1979), 73–83; J. Sachs and F. Larrain, *Macroeconomics in the Global Economy* (Englewood Cliffs, NJ: Prentice Hall, 1993); S. Fischer, R. Sahay and C. Vegh, 'Modern Hyper- and High Inflation', *Journal of Economic Literature* 40/3 (2002), 837–80; R. Dornbusch, S. Fischer and R. Startz, *Macroeconomics*, 13th edn. (New York: McGraw Hill, 2018); G. Mankiw, *Principles of Economics*, 9th edn. (Boston, MA: CENGAGE Learning Custom Publishing, 2021); P. Krugman and R. Wells, *Volkswirtschaftslehre* (Stuttgart: Schäffer-Poeschel, 2010); O. Issing, *Einführung in die Geldtheorie*, 15th edn. (Munich: Vahlen, 2011).

²⁷ Sachs and Larrain, *Macroeconomics in the Global Economy*, 344; Dornbusch, Fischer and Startz, *Macroeconomics*, 179.



predicted by economic agents. High and strongly fluctuating inflation rates can create additional adjustment burdens and consequential problems for an economy.

In the following analysis of the possible real economic effects of inflation, it should also be borne in mind that a number of these effects probably only have a high macroeconomic impact during double-digit inflation. However, this should not be misinterpreted to mean that current inflation rates in the higher single digits are not harmful and have no serious negative economic and social consequences.

Moreover, high-single-digit inflation rates carry the danger of getting out of hand, as inflation expectations rise, wage–price spirals tend to set in, and people generally get accustomed to higher inflation rates and adapt their economic behaviour.²⁸ Thus, self-reinforcing mechanisms can set in and lead to further increasing inflation rates. If such a trend is not reined in, inflation can easily get out of control and rise to high double- or even triple-digit levels (see the box on ‘Italy’s *scala mobile*’ below). In fact, a review of the literature from the 1980s shows that inflation may accelerate once it crosses a certain threshold but that this is difficult to quantify empirically.²⁹

In addition, inflation persistence is a common problem according to past experiences:³⁰ the higher the inflation rates, the longer they last. In line with this observation, inflation persistence has declined in recent decades as inflation rates have been considerably lower. However, if the current high inflation is not reined in sufficiently soon, the problem of inflation persistence is likely to resurface.³¹

2.1 Purchasing power and wealth effects

In the wake of any consumer price increase, a given nominal income immediately loses purchasing power. The real value of income declines in line with the rate of inflation, and this reduces the (material) standard of living if incomes are not adjusted for inflation within a reasonably short period of time. Lower-income earn-

²⁸ U. Malmendier and S. Nagel, ‘Learning From Inflation Experiences’, *Quarterly Journal of Economics* 131/1 (2016), 53–87.

²⁹ M. Bruno and W. Easterly, ‘Inflation and Growth: In Search of a Stable Relationship’, Federal Reserve Bank of St. Louis, *Review* 78/3 (1996), 139–46.

³⁰ T. Cogley and T. J. Sargent, ‘Evolving Post-World War II U.S. Inflation Dynamics’, *NBER Macroeconomics Annual* 16/1 (2002), 331–73.

³¹ T. Kurozumi and W. Van Zandweghe, ‘Why Has Inflation Persistence Declined?’, *The Macro Bulletin*, 11 April 2018, Federal Reserve Bank of Kansas City.



ers are likely to be comparatively more disadvantaged by inflation if everyday goods such as food or energy products become significantly more expensive, because they usually spend a larger share of their income on these products. The same applies to the purchasing power of accumulated financial assets—assuming that the assets' purchasing power is not secured by higher nominal interest rates or other means. If lower and middle-income earners tend more strongly towards assets for which there is no or only limited adjustment to inflation of this kind, greater losses in purchasing power are likely to occur among these more vulnerable groups. Overall, these inflation-induced losses in living standards mean that money loses its utility and acceptance in its function as a store of value. At high inflation rates, this is the case even in the short term.

In addition, there may also be structural effects as a result of high inflation rates. These effects relate on the one hand to a change in the structure of consumption and on the other hand to a reorientation of the choice between consumption in the present and saving (i.e. consumption in the future):

- The current sharp rise in energy and food prices is likely to lead only to a rather moderate decline in the quantity demanded of these goods. This is because demand is not very price-elastic, at least in the short term, when it comes to essential goods and services as there are only limited substitution possibilities. If more income is needed for more expensive essential goods, less spending potential remains for other goods, even if their prices are unchanged. This inflation-induced *expenditure reallocation* likely lowers the satisfaction and utility of consumers and thus the overall economic welfare in a society.
- High inflation rates can also distort *households' incentives to save and invest* in financial markets. The incentives to save depend, among other influences, on the need for precautionary savings (e.g. to cater for possible cases of unemployment or disability), on the preference for future consumption (e.g. for old-age provision) and on the goal of accumulating assets to generate income (e.g. through interest, rents, dividends). In addition, there are inheritance motives. Inflation can distort these intertemporal decisions in different ways. This is the case when certain asset positions cannot be hedged against an inflation-induced loss of purchasing power—for instance, by sufficiently increasing interest rates. Thus, a higher rate of inflation may lead to higher savings from current income,³² because people want to compensate for the inflation-related wealth loss by saving more

³² Mankiw, *Principles of Economics*, 690.



(and, in a mirror image, consuming less). Similarly, wealth losses due to an inflation-induced financial market crisis may affect savings and consumption. Lower incentives for private consumption have the potential to act as a drag on economic growth.

- Inflation can distort private savings to the detriment of certain types of *private investment*, particularly financial and cash investments, if the rise in nominal interest rates follows price increases only with a lag or not to the full extent. The theoretically postulated Fisher effect,³³ according to which nominal interest rates rise in line with the rate of inflation, would not be effective in this case. As a result, the real interest rate (the nominal interest rate deflated by the inflation rate) and thus the real income from these assets will fall. Consequently, a flight into supposedly ‘safe’ assets can be triggered as other forms of investment and stores of value are sought. These include gold, for example, but also property. Investors might also engage in more complicated and possibly riskier financial transactions in order to avoid a loss of wealth. In the 1970s in Germany, for example, there was a flight into property—dubbed ‘concrete gold’—as the real value of this asset form was considered more stable than that of financial assets or savings deposits. It can be questioned whether this inflation-induced flight to supposed safety corresponds with the long-term investment preferences of private households. For example, property investments lack fungibility. If the inflation-induced higher investment in property assets does not correspond to fundamental consumer preferences, inflation leads to a decline in economic welfare. Moreover, as a consequence of such a flight into property assets, asset price inflation may occur (see the box on ‘House price inflation’). In the extreme, the property market can overheat with the emergence of house price bubbles. This in turn entails the risk that the owners of these tangible assets may suffer losses in the event of future price corrections in these markets—similar to the global financial market crisis of 2008/2009.³⁴
- Moreover, high inflation rates and frequent price changes impose additional *transaction costs* on consumers—for monitoring prices and adjusting consumption decisions. In this context, ‘shoe leather costs’ can be addressed.³⁵ In times of very high inflation (especially during periods of hyperinflation), people try to reduce their cash holdings as much as possible in order to reduce the loss of purchasing power. This requires a great deal of time and, figuratively speaking, wears out shoes because people are constantly on the run to buy ‘something’. This seriously distorts consumption decisions and may lead to

³³ I. Fisher, *The Theory of Interest: As Determined by Impatience to Spend Income and Opportunity to Invest It* (Clifton, NY: Augustus M. Kelly, NY, 1930).

³⁴ Dornbusch, Fischer and Startz, *Macroeconomics*, 500.

³⁵ Mankiw, *Principles of Economics*, 627.

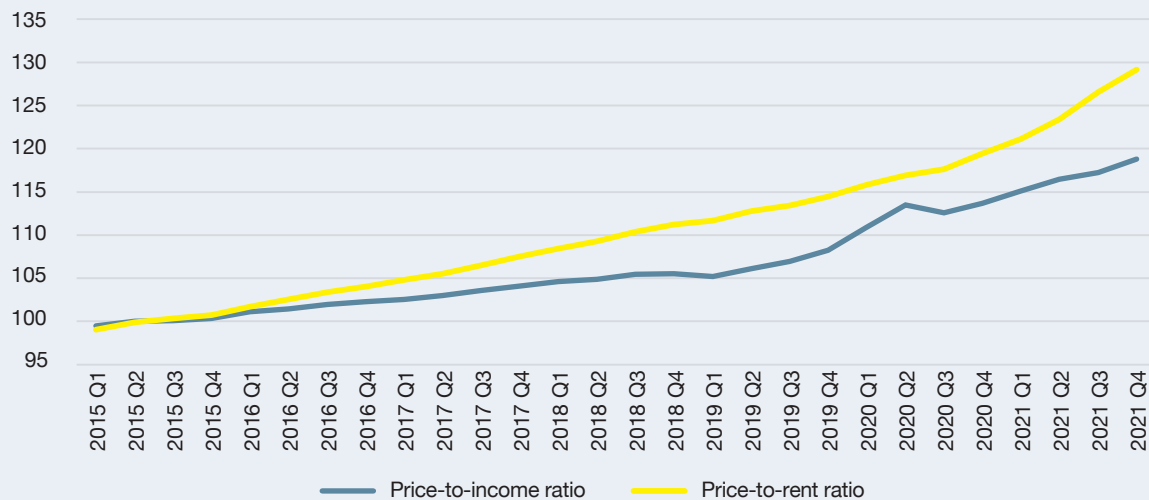


the purchase of goods, such as consumer durables that would likely not be bought to this extent under normal conditions. In this case, money not only loses its function as a short-term store of value, but there is also a risk that it may become less and less popular as a means of payment. However, these effects usually set in only with galloping inflation (see the box on 'The great inflation in Germany in the 1920s').

House price inflation

Price increases are also prevalent in residential housing markets. Different measures can be used to put property price developments into perspective. The price-to-income ratio, which measures the nominal house price divided by the net nominal disposable income per capita, exhibits a clear upward trend in numerous European countries. This index rose by 18% between 2015 and 2021 in the euro area. The price-to-rent ratio index, which relates the nominal house price index to the rent price index, increased by as much as 30% during this time span.³⁶

Figure 2.1 Development of housing price indicators in euro area from 2015 to 2022



Source: OECD.

³⁶ OECD, 'Analytical House Prices Indicators' (2022).



Apart from the generally high price dynamic, high transaction costs for buying property in some European countries have also contributed to the high prices of housing investments.

These trends are likely to continue as structural dynamics are expected to maintain upward pressure on residential housing market prices. The interplay of increased demand and supply-side constraints will likely continue in the near future.³⁷ This relates, firstly, to the demand side, as the following exemplifying arguments show:

- Lower credit costs fuel housing demand. Empirical evidence shows that decreases in interest rates and in real mortgage lending rates coincide with increases in property prices.³⁸ Assuming the continuation of the loose monetary policy pursued by the ECB, residential housing prices can be expected to remain at high levels.
- Higher prices and the fear of inflation (as well as the low-interest-rate environment) induce households to shift their wealth to real assets and in particular to housing investments in the light of a lack of alternative profitable investment options.
- This effect is amplified by rapidly rising house prices so that households prefer to buy property today rather than tomorrow.
- Immigration in recent years, a growing preference for larger housing spaces among well-off people and the need for more housing space due to increased working from home have also increased housing demand.

Concerning the supply side, there are also some exemplifying trends to mention:

- A lack of building-site development and of granting building licences constrains the supply side. This is in part also a problem caused by overly complex administrative procedures.

³⁷ ECB, *Financial Stability Review*, May 2022 (Frankfurt am Main, 2022).

³⁸ G. D. Sutton, D. Mihaljek and A. Subelyte, *Interest Rates and House Prices in the United States and Around the World*, BIS, Working Paper no. 665 (Basel, 2017); ECB, *Financial Stability Review*.



- The Covid-19 pandemic and the war between Russia and Ukraine have also left their footprint on the residential property markets. Both events have caused global supply-chain disruptions that have resulted in material shortages and price increases. Together with labour shortages, these could cause supply-side constraints. If building firms are unable to pass on their higher production costs to buyers, profit margins and thus housing construction activities are likely to decline.

On the one hand, a persistent increase in rents and residential house prices has a redistributive dimension and could, eventually, harm economic development in the EU. High rents particularly affect low-income households, whose rent expenditure makes up a relatively large share of their overall expenditure compared to that of more well-off households. The same is true for the younger generation, whose incomes are still at a relatively low point in the income life cycle and who might have to deal with less stable careers in the future economic environment. A higher price-to-income ratio also renders it more difficult (and riskier) for these groups to afford housing investments. If housing takes up a larger share of their incomes, their general ability to spend decreases.

On the other hand, homeowners may profit substantially from increasing property prices and rents. As homeowners tend to be relatively better-off, they have a lower marginal propensity to consume. Thus, the redistribution between less well-off and wealthier households caused by increasing rents and property prices has the potential to decrease private consumption and thus economic growth. Moreover, the above-mentioned possible decline in construction activity due to higher production costs may also negatively affect economic development, as gross value added in the construction sector accounts for roughly 5% of GDP in the EU.³⁹ In addition, there is a certain danger in some European countries that property markets might overheat. Due to the increased leverage of homeowners, an ensuing property market crisis could dampen economic activity and also become a burden for banks.⁴⁰

³⁹ Ecoscope, 'Monetary Policy and Housing Markets: Interactions and Side Effects' (25 June 2021).

⁴⁰ ECB, *Financial Stability Review*.



The great inflation in Germany in the 1920s

The hyperinflation that occurred in the Weimar Republic in 1923, which had its origins in the First World War and began in August 1922, was mainly due to government monetary financing by the government-dependent central bank (the Reichsbank). The German government submitted Treasury bills to the Reichsbank at a low discount rate and received the equivalent money as credit.⁴¹ The drivers of hyperinflation also included past war financing obligations and later on reparations, which were supported by monetary financing. The German currency became increasingly depreciated, which in turn made imports ever more expensive and exacerbated inflation. Set as equal to one in 1913, the US dollar was quoted as being equivalent to 1,000 billion marks by December 1923. The cost-of-living index stood at 1.25 trillion in the same month; the wage index only at 694.⁴² This demonstrates the loss of purchasing power of wages. However, it was not only wage earners who were victims of inflation, but also pensioners, civil servants and asset owners who had invested their savings in assets such as government bonds, mortgages, mortgage bonds and savings account balances.⁴³ In the course of 1923, cash became worth less every day, and ultimately every hour, resulting in everyone wanting to get rid of it quickly, thereby implying ever increasing shoe leather costs. The circulation of banknotes accelerated rapidly, and the printing presses could not keep up with the printing of new bills: 300 factories supplied the paper for the banknotes, and 150 printers ran 3,000 presses day and night to print the bills, which had ever greater nominal value.⁴⁴ 'Trucks carted the paper money . . . to the banks, and a fortnight later one found hundred-thousand-mark bills in the gutter: a beggar had contemptuously thrown them away because they were hardly worth anything anymore'.⁴⁵

⁴¹ R. Dornbusch and S. Fischer, 'Stopping Hyperinflations Past and Present', *Weltwirtschaftliches Archiv* 122/1 (1986), 1–47; Sachs and Larrain, *Macroeconomics in the Global Economy*, 910.

⁴² *Statistisches Reichsamt*, 'Zahlen zur Geldentwertung in Deutschland 1914 bis 1923, Sonderhefte zu Wirtschaft und Statistik', Special Issue, 5/1 (1925), 5.

⁴³ S. Zweig, *Die Welt von Gestern, Erinnerungen eines Europäers* (Amsterdam, 1949), 103.

⁴⁴ G. Stolper, K. Häuser and K. Borchardt, *Deutsche Wirtschaft seit 1870*, 2nd edn. (Tübingen: Mohr, 1966), 100.

⁴⁵ Translated from Zweig, *Die Welt von Gestern*, 347.



2.2 Allocation effects

The potential effects of high inflation rates on the structure of consumption and wealth discussed in the previous section also have direct effects on an economy's production and employment structure. For example, if inflation-induced losses in purchasing power mean that more income has to be spent on essential goods, less income is correspondingly available for other goods. Certain service providers such as those in the leisure or hospitality sector may suffer as a result. Real demand for these goods declines, although their prices may not have changed, triggering corresponding reactions on the production side of the economy as service employment declines. In contrast, the flight into 'concrete gold' as mentioned above can trigger a positive demand shock in sectors such as the construction industry and its supplier industries, leading to higher production and employment, but possibly also to higher construction prices given limited production capacities.

Prices and price changes in a market economy provide essential information about consumer preferences and also about the supply conditions and production costs of companies. For example, the large increases in producer and consumer prices in Germany in 2021 and especially in the first half of 2022 reflect the sharp rise in commodity and energy prices due to the effects of the Covid-19 pandemic and, most recently, the Russian invasion of Ukraine.⁴⁶ Prices indicate the scarcity of goods and factors of production, which in this case result mainly from major problems in global supply chains and the restriction of the energy supply by energy producers.

In general, prices reveal knowledge that is widely dispersed in a society. Against this background, von Hayek described the price system 'as a kind of machinery for registering change'.⁴⁷ In a market economy, the informational or signalling function of prices and their changes is used to coordinate billions of individual economic decisions and plans. Thus, changes in the relative prices of goods signal changes in the relative shortages of goods (and factors of production) in normal times. Such changes result, for example, from technological progress or changes in preferences.

⁴⁶ M. Grömling and H. Bardt, *Bleiben Unternehmen auf den hohen Kosten sitzen? Ergebnisse der IW-Konjunkturumfrage zur Preisentwicklung in Deutschland*, IW, Report no. 36 (Cologne, 2022).

⁴⁷ F. A. von Hayek, 'The Use of Knowledge in Society', *American Economic Review* 35/4 (1945), 527.



One of the most important drawbacks of high inflation rates derives from the fact that high price increases can disrupt these signalling and coordinating functions of prices. In this scenario, price changes no longer reflect the real economic shortages of supply or the needs and preferences of consumers for certain goods. As a result, the allocation of resources is disturbed and investment is potentially directed towards less efficient uses: the structure of production and sectors in an economy may deviate from the more efficient structure in a world without high inflation rates where price signals are undistorted. Thus, high inflation can have detrimental medium- and long-term effects on the growth potential of an economy. In this context, the study by Doerr points out that an increase in property prices, for example, can lead to a reallocation of investment (and thus physical capital) and labour to less productive firms.⁴⁸ This is because companies with a higher share of property in their capital stock obtain more favourable financing conditions—in contrast to firms for which intangibles are more important.

One of the mechanisms for the disturbance of the signalling function of prices lies in the fact that inflation increases uncertainty about price signals. Companies may find it increasingly difficult to distinguish a market-driven increase in demand for their goods and the associated price effects from a general macroeconomic price effect due to inflation. Production capacities might therefore be built up as a price increase is misinterpreted. Thus, business decisions might be made which are not sustainable in the long term and may lead to restructuring at a later date. Alternatively, investments in other areas may be cancelled if a demand-driven price increase is mistakenly taken for a general macroeconomic price increase. Thus, due to unclear price signals, long-term economic opportunities are not sufficiently developed. In addition, measuring and reporting a company's results also becomes more difficult and uncertain if costs, prices and sales are subject to constant changes. This may also complicate negotiations with banks if new capital for investment purposes is to be raised.

Additional uncertainties and costs for companies due to high inflation can be well illustrated with 'menu costs'. This term comes from a time when menus in a restaurant were either still written by hand or produced by a print shop. Frequent price adjustments require repeated new menus—and impose the associated costs on firms. In general, high, discontinuous and volatile price changes make price calculation in companies more difficult and tie up personnel and time in price adjustments and negotiations. These costs and efficiency losses also exist in the case of anticipated inflation.⁴⁹

⁴⁸ S. Doerr, *Housing Booms, Reallocation and Productivity*, BIS, Working Paper no. 904 (Geneva, 2020).

⁴⁹ Dornbusch, Fischer and Startz, *Macroeconomics*, 180.



Impact on international competitiveness and resource allocation

In addition to these potential domestic effects, inflation can also affect international trade and, in turn, international production structures and resource allocation. This does not only concern the decision as to whether a good is produced and purchased by a domestic or a foreign company, but also the production decisions within multinational companies. In the following, it is shown that this specific inflation effect depends on the underlying exchange rate regime. For a better understanding, the following explanations of the nominal and real exchange rate are helpful. For foreign trade transactions and the associated production and location decisions, it is not only the nominal exchange rate that is relevant, but also the ratio of the domestic price (P_d) of a given good or basket of goods (X) to the corresponding foreign price (P_f) of the same good or basket of goods.

The nominal exchange rate (E_n) indicates how many units of foreign currency (e.g. \$) have to be paid for one unit of domestic currency (e.g. €). For example, the exchange rate of the euro in US dollars is:

$$① E_n = \$ / €$$

If this nominal exchange rate increases (decreases), this means an appreciation (depreciation) of the domestic currency against the foreign currency. In case of an appreciation (depreciation) of the domestic currency, more (less) US dollars have to be exchanged for one euro.

The real exchange rate (E_r) defines how many units of a given foreign good (X_f) (or foreign basket of goods) have to be bid for one unit of the corresponding domestic good (X_d). The following relationships exist between nominal and real exchange rates:

$$② E_r = (E_n * P_d) / P_f$$

with $P_f = \$/X_f$ and $P_d = €/X_d$ as prices of the respective goods (baskets)

$$③ E_r = (\$/€ * €/X_d) / \$/X_f = X_f / X_d$$



According to these transformations, it can be seen that the real exchange rate represents an exchange ratio of goods. This ratio corresponds to the 'terms of trade', which also indicate a real exchange ratio between two economies—or more precisely, between the goods of both countries.

According to equation (3), a decrease in the real exchange rate means that for one unit of the domestic good (X_d) fewer units of the foreign good (X_f) have to be spent. From the domestic perspective, this can be interpreted as real depreciation. Accordingly, foreign goods become more expensive. From the domestic perspective, this tends to have a negative effect on domestic imports of foreign goods, but can have a positive effect on domestic exports which become cheaper when measured from the foreign perspective. The reverse is true for an increase in the real exchange rate. Real appreciation favours imports and dampens domestic exports. The real exchange rate can thus be used as an indicator of the price competitiveness of domestic companies.

Against this background, it is now possible to illustrate the effects of different price developments at home and abroad on the real exchange rate and, derived from this, on the international division of labour and production structures. The following explanation does not apply to short-term but to medium- and long-term inflation differences. It should also be noted that, in addition to these monetary factors, a large number of other location factors are relevant for international production decisions. Moreover, the exchange rate regime of the economies under consideration must also be taken into account when analysing inflation effects on international production structures.

In a *fixed exchange rate regime*, the nominal exchange rate (E_n) is fixed. According to equation (2), this means that a sustained increase in domestic prices (P_d) compared with foreign prices (P_f) leads to an increase in the real exchange rate (E_r). Thus, from a domestic perspective, higher domestic inflation leads to real appreciation. This, in turn, impairs the export opportunities of domestic companies and increases import pressure, as domestic goods become more expensive relative to foreign goods. It can be deduced from this that higher domestic inflation in the medium to long term will lead to a competitive and locational disadvantage for companies that produce tradable goods.

In addition to the possible effects on production structures, the current account position of a country is also affected by inflation differentials according to these derivations. Due to the export and import effects, current account deficits tend to be expected in countries with higher inflation rates and fixed exchange



rates. As current account deficits imply net capital imports and thus an increase in foreign debts, high and persistent current account deficits can eventually lead to a balance of payments crisis, when foreign creditors start questioning the solvency of the respective country (see the box titled 'Argentina: Decades of macroeconomic instability').

Argentina: Decades of macroeconomic instability

Argentina is a prime example of the detrimental effects of high inflation. Between 1960 and 2017, it suffered from three periods of hyperinflation and, often connected, several balance of payments crises, two defaults on government debt and three banking crises.⁵⁰ Following several monetary reforms, the value of the currency was cut by a factor of 10 trillion between 1969 and 1991.

In 1989 and 1990, a new period of hyperinflation developed. As a result, the banking system broke down, capital was rapidly removed from the country and the ratio of total investment to GDP collapsed (Figure 2.2), dampening growth prospects in the medium term. This led to very high interest rates which severely affected the ability of the government to finance its actions. Due to these detrimental effects, a so-called currency board was adopted in April 1991 which established a fixed exchange rate between the US dollar and the newly created peso. This allowed for a decade of relative stability. However, currency misalignments developed over the course of several emerging market crises and the currency board had to be abandoned in 2002 amid one of the country's worst depressions. The country is still prone to high levels of macroeconomic instability, disappointing growth performance and economic recessions.⁵¹

Since 2014, Argentina has again faced high inflation rates of between nearly 40% and over 50%. In parallel, the investment rate declined until 2019 and only recovered due to government support during the coronavirus crisis. The high inflation rates have also put pressure on the exchange rate. Currency reserves are dwindling as a result of ongoing attempts to stabilise the peso. This situation puts the Argentinian central bank in a dilemma because the depreciating currency forces it to raise interest

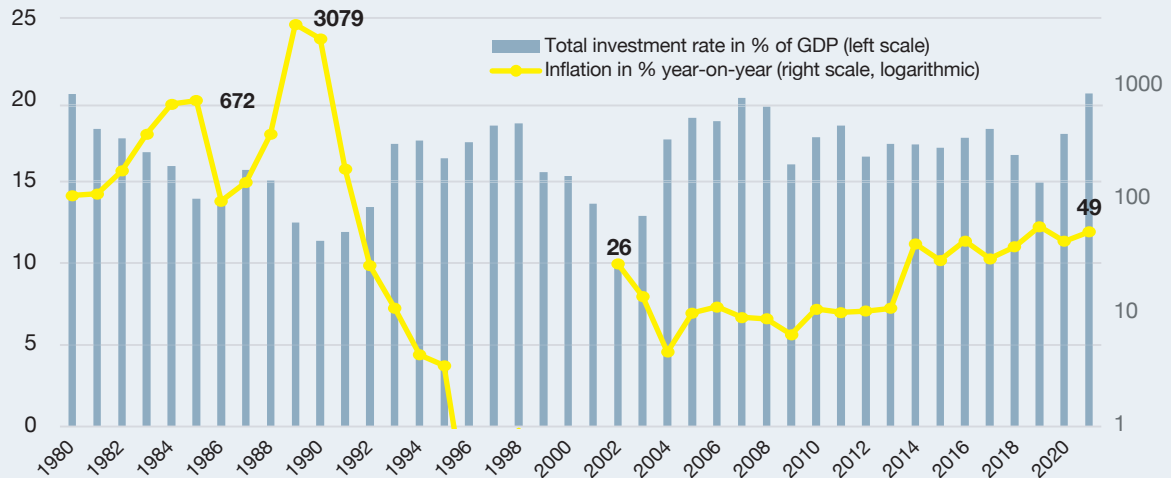
⁵⁰ Sachs and Larrain, *Macroeconomics in the Global Economy*, 337; F. Buera and J. P. Nicolini, *The Monetary and Fiscal History of Argentina, 1960–2017*, Becker Friedman Institute, Working Paper (Chicago, 2019).

⁵¹ M. Feldstein, 'The Destructive Power of Inflation', *Project Syndicate*, 12 January 2017.



rates which then cools down the economy. Currently, the interest rate stands at a whopping 52% to bolster confidence in the local currency. Also as a result of inflation-related currency depreciation, Argentina's foreign currency debt has doubled since 2015. In 2015, Argentinians paid roughly 8 pesos for 1 US dollar; today, 123 pesos are needed. Hence, inflation also adversely affects the government's ability to borrow, boding ill for its debt sustainability in the face of rising interest rates.

Figure 2.2 Total investment in % of GDP and inflation % (year on year – logarithmic scale)



Sources: IMF; Macrobond.

Note: Inflation rates between 1996 and 2001 lie between -1.2% and 0.9% and cannot be depicted in logarithmic scale.



In a *system of flexible exchange rates*, on the other hand, the nominal exchange rate usually responds to inflation differentials. Purchasing power parity theory suggests that price differences between countries lead to arbitrage processes when goods are freely traded and when tradable goods are highly important in those economies. In this ideal theoretical case, a sustained inflation-induced higher increase in domestic prices (P_d) compared with foreign prices (P_f) leads to a depreciation of the domestic currency (= decrease in the nominal exchange rate (E_n)). If the depreciation fully reflects the inflation differential between the domestic and foreign currencies, then the real exchange rate remains constant and the price differentials are equalised by the exchange rate. Accordingly, higher domestic inflation—exclusively with regard to this transmission channel—would not have any real economic consequences in terms of changed production structures or balance-of-payments effects. This statement, however, only holds if the nominal exchange rate fully offsets inflation differentials. Effects via other transmission channels—such as the impact of a devaluation on international capital investments—are not taken into account. It has to be noted that a full offset of inflation differentials via a nominal exchange rate change might not be achieved in practice, as nominal exchange rates are also determined by international capital movements and other factors such as productivity differences.

Experience shows that significantly diverging inflation paths also affect the stability of exchange rate regimes. Prior to the European Monetary Union and the introduction of the euro in 1999, the European Monetary System (EMS) had been in existence since 1979. This was not a fixed exchange rate system, but consisted of bandwidth-fixed but adjustable exchange rates between the currencies of the participating European economies. Due to strongly diverging price developments between the EMS member states, adjustments to the nominal exchange rates were made frequently. To compensate for the competitive disadvantages resulting from their higher inflation rates, the respective currencies were devalued. For example, in the period 1979 to 1992, the Italian lira was devalued in multiple steps against the other EMS currencies, and against the German currency by as much as 40%. The average annual inflation rate in Italy during this period was nearly 10%, well above the German average of a good 3% per year. After Italy ceased participating in the EMS in September 1992, the lira continued to depreciate against the Deutschmark (DM) until 1998. Whereas in 1979 some 2.2 DM had to be paid for 1,000 lira, in 1998 the cost of 1,000 lira was just 1 DM. This shows that even in a system with exchange rate target zones, persistent inflation differentials among participants can trigger permanent adjustments of nominal exchange rates, which are ultimately intended to correct the real exchange rate or the real exchange ratio of goods. However, this exchange rate volatility creates additional adjustment costs in many areas of all participating economies.



2.3 Distributional effects

A central consequence of inflation is the associated loss of purchasing power (as mentioned above). These losses occur when the various nominal incomes generated in an economy are not hedged against inflation and, as a result, corresponding real incomes decline. This raises the question of why such hedging does not take place and whether the losses in purchasing power of some economic groups are offset by the corresponding ‘gains’ of others.⁵²

The recipients of labour income can become the losers of inflation if their wages are not raised in line with price level increases. According to the *wage-lag hypothesis*, there is often a time lag in the adjustment of wages and salaries to inflation. This is due to wage rigidities resulting, for example, from contractual agreements such as the duration of a collective bargaining agreement. This reduction in the real wages of employees can have the mirror effect of reducing inflation-adjusted costs for companies, which can have a positive impact on corporate profits if higher nominal sales prices for companies are not (completely) offset by higher nominal labour costs. It has to be borne in mind that the purchasing power of profit income also falls as a result of higher consumer prices.

Concerning the wage-lag hypothesis, a relativisation must be made:⁵³ if inflation is based—as in the current situation—on a macroeconomic supply or cost shock, then this positive distributional effect on corporate profits might not occur. For example, if inflation is triggered by higher raw material prices, leading to higher production costs, and if companies cannot pass on these higher costs to their customers in the form of higher sales prices, companies’ profits will deteriorate. If sales prices can be increased to the extent of the cost increase (pass-through), profits will not change. If labour costs are increased in this situation to stabilise real wages, companies’ production costs will rise further, leading either to a further reduction of profits (in the case of no or limited pass-through) or even higher sales prices (in the case of pass-through). In the latter case, there would be the risk of a cost–price–wage spiral because the renewed loss of purchasing power among employees could lead to renewed (even higher) nominal wage increases. Depending on the pass-through conditions, supply or commodity price shocks might not result in a redistribution from workers to firms. Conditions could even be to the disadvantage of firms if higher costs cannot be passed through. In

⁵² Claassen, ‘Inflationseffekte’, 78.

⁵³ Dornbusch, Fischer and Startz, *Macroeconomics*, 187.



any case, such resource shocks lead to a transfer of income from the domestic economy to the countries from which the resources or commodities originate. Looking at the current situation in Germany, this can be seen from the fact that producer prices are rising more or less in line with import prices.

According to the *transfer-lag hypothesis*, recipients of transfer income may suffer losses in purchasing power in the event of inflation. This applies to all government transfers or social benefits such as pensions, social assistance, child benefits or student loans, provided there is no automatic inflation indexation. In other words, this loss of real income always applies if transfer payments are not adjusted to inflation quickly enough and/or not to the full extent.

As a result of the two lag hypotheses, there is also a risk of unwanted redistribution at the expense of more vulnerable groups of society and thus rising inequality:⁵⁴

- Redistribution can occur between transfer recipients and wage earners if wage earners manage to negotiate sizeable wage increases while an increase in transfer payments cannot be achieved to the same extent.
- The real income losses of the transfer recipients may also go hand in hand with corresponding gains on the part of the transfer payers. This would be the case, for example, if the government, as the main transfer payer, was to benefit from inflation-induced higher revenues while transfer payments (and other public expenditures) remained constant.
- Income inequality also rises if poorer households with a larger share of expenditure relative to their incomes suffer more from inflation-induced purchasing power losses than more well-off households who spend a smaller proportion of their incomes. The latter would also lose out from inflation, but to a lesser extent.

Distributional effects due to inflation are also possible in the case of capital incomes. According to the *interest-rate-lag hypothesis* or *creditor–debtor hypothesis*, a *redistribution from creditors to debtors* takes place in terms of capital incomes and also with regard to the real value of a loan or asset.

⁵⁴ Sachs and Larrain, *Macroeconomics in the Global Economy*, 350; Dornbusch, Fischer and Startz, *Macroeconomics*, 181.



To better understand the mechanisms of this redistribution effect, reference again needs to be made to the Fisher effect, according to which, nominal interest rates should rise in line with inflation so that the real interest rate remains constant. The real interest rate is supposed to reflect the real economic conditions of the credit or investment relationship, such as the supply of and demand for funds. In perfect markets, the real interest rate is also based on capital productivity. According to the interest-rate-lag hypothesis, however, this might not be the case. If the Fisher effect is not (fully) effective, the real interest rate will fall in times of rising inflation rates:

- In this case, inflation will result in a redistribution between creditors and debtors. Creditors will suffer losses as the general increase in prices reduces the purchasing power of previously nominally fixed interest payments. On the other hand, debtors will benefit from inflation if their total income, from which they make constant nominal interest payments, increases due to inflation.
- In addition, there will also be a redistribution between creditors and debtors regarding their asset positions if assets are not completely hedged against higher inflation, for example, by accordingly higher nominal interest rates. The channels of the redistribution are the same as for capital incomes.
- Distribution effects can also occur within the group of creditors to the possible disadvantage of more vulnerable groups of society. This is the case if households with lower incomes tend more strongly toward savings deposits and financial products in which interest rates are not adjusted to inflation, while more prosperous creditors might be better able to hedge their capital incomes.

Distributional effects are also relevant on the macroeconomic level. With regard to the creditor–debtor hypothesis, the net position of the economic sectors is important. For instance, when looking at the historical situation in the US,⁵⁵ the household sector has a net creditor position. This contrasts with the net debtor positions of the financial sector and, above all, the government. With few exceptions, this asset structure is likely to be observed in most advanced economies (with the non-financial corporate sector variously in a net debtor or a net creditor position). Accordingly, it can be inferred that in times of high inflation and the insufficient protection of assets and capital incomes, there is a redistribution from households to the government and the financial sector. Inflation relieves the burden on sovereign debtors vis-à-vis the subscribers of

⁵⁵ Sachs and Larrain, *Macroeconomics in the Global Economy*, 350; Dornbusch, Fischer and Startz, *Macroeconomics*, 183.



government bonds (Section 3). The financial sector benefits, for instance, if investors hold large amounts of money in bank accounts or as savings deposits.

Finally, a distributional analysis must take into account intra-sectoral differences in asset positions. Within the household and corporate sectors, there are net creditors and net debtors. With regard to the household sector, it can be hypothesised that older generations are more likely to be net creditors and thus to suffer more from inflation-induced asset losses. In this respect, inflation is also accompanied by inter-generational distributional effects.⁵⁶

2.4 Taxation effects

In the previous section, it was shown that the government in its role as debtor (and as issuer of government bonds to finance government spending) may experience relief in the case of high inflation rates. Unless nominal assets are comprehensively hedged against inflation, the real value of government debt falls, with the corresponding distributional effects between creditors and debtors. In this context, it must also be taken into account that inflation can have a direct impact on government debt, as government spending and revenues are also affected. In the following, the focus is on the revenue and taxation side,⁵⁷ while the impact of inflation on government spending and government debt is analysed in Section 3.1.

On the revenue side, a number of transmission mechanisms are relevant: if nominal government revenue rises, the share of government debt-related expenditure (interest payments and debt repayments) declines. The government can increase its real tax revenue in times of inflation, as the tax base usually grows because consumption expenditure and incomes are likely to increase more in nominal terms due to inflation. A larger nominal tax base generates higher tax revenues (at constant tax rates). This effect is even more pronounced if income taxes are based on a progressive tax scale—provided that the tax brackets are not adjusted for inflation and that the nominal incomes of wage earners and entrepreneurs rise with inflation. In this case, taxpayers move into a higher tax bracket with higher tax rates, even though their real incomes and their associated wealth position have not changed. When inflation moves taxpayers into

⁵⁶ Sachs and Larrain, *Macroeconomics in the Global Economy*, 350.

⁵⁷ *Ibid.*, 346



higher tax brackets, the real value of their tax liabilities increases or, in a mirror image, their real disposable income decreases. This effect applies not only to labour income, but also to other income forms such as nominal interest income. As a result of this ‘cold progression’, real income is redistributed from taxpayers to the government—and in this respect inflation can also be understood as an additional ‘tax’.⁵⁸ As with nearly any tax, the ‘inflation tax’ not only has effects on distribution in an economy, but also on the allocation of production factors. For example, an ‘inflation tax’ can act as a disincentive for investment activity because of lower real capital incomes.

Further allocative disincentives for investment can result from inflation-distorted taxation. In many economies, companies can deduct a certain amount of depreciation on their fixed assets (e.g. machinery, vehicles, buildings) from their tax-relevant revenues and thus reduce their tax payments. This is intended to enable companies to finance necessary replacement investments from their profits to maintain the capital stock. If depreciation is based on the historical acquisition cost of the capital goods and the replacement values rise sharply as a result of inflation, then the ‘purchasing power’ of depreciation falls accordingly. Inflation erodes the real value of allowable depreciation and this can act as an obstacle to investment and capital maintenance in an economy.⁵⁹ Thus, inflation has allocative effects via taxation and via weakened investment opportunities for firms. Lower investment activity reduces the future growth potential.

Similar effects arise from a tax on capital gains. This tax is based on the difference between the (historical) acquisition value of an asset and its subsequent selling price. In the absence of inflation or in the case of price increases that are considered normal, the difference would express a real increase in value, which ultimately also justifies taxation—provided that this type of tax is based on a social consensus. However, purely inflation-induced increases in value create spurious gains and thus a tax burden for which there is no real economic justification. This tax effect of inflation then also has distribution and allocation effects.

However, taxpayers benefit from delays in the collection and payment of taxes. In the case of high inflation rates and rising nominal incomes, it is easier for taxpayers to pay the past-linked nominal tax burden from their current income at a later point in time.

⁵⁸ Dornbusch, Fischer and Startz, *Macroeconomics*, 183.

⁵⁹ Sachs and Larrain, *Macroeconomics in the Global Economy*, 348.



2.5 Growth and employment effects

In the context of inflation, the question always arises as to whether positive effects on economic growth and employment can result. Here, we are concerned with the direct effects of inflation—and not externally driven effects, such as those of a positive demand shock that raises both inflation and economic growth. An example of the latter could be the recent high fiscal stimulus in the US.⁶⁰ Moreover, longer-term effects on economic growth have to be distinguished from short-term effects on the business cycle. Whether rising consumer prices have an impact on economic development in the longer run depends on the possible effects of inflation on the production factors of labour and human capital, capital (including infrastructure), technological knowledge and natural capital.

These factors of production are essentially the result of investment, and it is therefore important to determine whether and, if so how, inflation itself can improve the investment environment in a country in the longer term. Several transmission channels can be considered in view of the inflation effects already highlighted in this section:⁶¹

- In the context of interest rate effects, it has been pointed out that real interest rates can fall in the wake of inflation if nominal interest rates do not rise in line with the rate of inflation. As a result, the financing conditions for debt-financed investments improve and this can favour private and public investment, and thus have positive effects on the capital stock and the growth potential of an economy.
- The creditor–debtor argument presented above has the same effect. If inflation persistently favours the debtors of financial claims (in this context, the corporate sector and the government), this can also stimulate private and public investment activity. On the government side, the possible positive tax effects of inflation (e.g. cold progression) also tend to favour government investment opportunities.
- If the wage-lag argument holds, then inflation can also improve investment conditions. This is the case if the profit situation of companies improves because wage increases lag behind price increases and real wages fall. It has already been pointed out in this context that this profit effect does not occur in the case of a supply or cost shock.

⁶⁰ J. Furman, 'Why Did (Almost) No One See the Inflation Coming?', *Intereconomics* 57/2 (2022), 85.

⁶¹ Issing, *Einführung in die Geldtheorie*, 234.



However, the effectiveness of these three potential effects on the investment conditions of an economy and thus on the production factor endowment depends on preconditions. Either the economic agents are subject to the so-called money illusion, meaning that they do not perceive a deterioration in their income and wealth position associated with inflation, or that they do not consider it relevant. If at all, this may be the case with low inflation rates at best. Alternatively, economic agents may realise the necessity of hedging and defending their income and asset positions against inflation, but might be unable to do so.

If, however, inflation is compensated for via wage negotiations and interest rate adjustments, the corresponding improvements in investment conditions are only of a temporary nature. Thus, with appropriate and fast adjustments, inflation would have no lasting impact on economic growth. However, this does not mean that the effects of inflation would be 'neutral'. On the contrary, in the case of high inflation rates, negative growth effects are to be expected. With high and persistent inflation it becomes more probable that economic actors become used to rapid price rises and become successful at pushing through compensation in the form of higher wages or interest rates. Moreover, with high inflation, the investment environment deteriorates, particularly in terms of the negative allocation effects mentioned above (Section 2.2).

Thus, high inflation is likely to damage the growth potential of an economy in the long run. This also is reflected in several empirical studies on the negative growth effects of higher inflation, even though there is no consensus in the economic literature on the numerical threshold at which this becomes relevant.⁶² Many of these studies, however, estimate that this threshold for developed countries is below current inflation rates, which reached above 8% in the summer of 2022.

There is also much contention in discussions of whether inflation can have a positive impact on labour market developments in the context of the Phillips curve.⁶³ The Phillips curve originally established a negative correlation between a change in nominal wages and unemployment. The 'modified Phillips curve' then established a negative relationship between inflation and unemployment. Accordingly, increasing inflation

⁶² For example, Bruno and Easterly, 'Inflation and Growth'; M. S. Khan and A. S. Senhadji, *Threshold Effects in the Relationship Between Inflation and Growth*, IMF, Working Paper no. WP/00/110 (Washington, DC, 2000); for a brief overview of the empirical literature, see S. D. Thanh, 'Threshold Effects of Inflation on Growth in the ASEAN-5 Countries: A Panel Smooth Transition Regression Approach', *Journal of Economics, Finance and Administrative Science* 20/38 (2015), 41–8.

⁶³ Sachs and Larrain, *Macroeconomics in the Global Economy*, 444; Issing, *Einführung in die Geldtheorie*, 227; Hüther and Obst, 'Phillipskurve und fiskalische Dominanz der Geldpolitik'.



could theoretically reduce unemployment in an economy. Derived from this, inflation would therefore have a positive effect on employment in an economy. This would then also have a corresponding impact on the growth potential—provided that the effects were permanent and the Phillips curve was stable in the long run. The central assumption here is that inflation lowers real wages and thus increases the demand for labour on the part of companies. However, this effect is only permanent if, as mentioned above, either the money illusion exists or nominal wages do not adjust to inflation. If these two conditions are not met, real wages will rise again over time and the potential short-term employment effect will be lost. In this case, inflation would have no positive permanent impact on employment, and thus on the growth potential of an economy in the longer run. At most, short-term economic impulses are possible as a result of the wage-lag effect.

Nevertheless, it is important to bear in mind that a wage–price spiral can be set in motion—causing corresponding instabilities in the labour market. As a result, companies may react in the long term by substituting labour with capital.⁶⁴ In the long run, this would damage employment and this part of the growth potential of an economy. Experience from the 1970s, for example, shows that both high inflation and rising unemployment (declining employment) can occur at the same time. These experiences of stagflation, as a result of the supply shocks at that time (due to the oil price crisis), have shown that the negative correlation between inflation and unemployment postulated by the Phillips curve is not accurate as a general proposition (see also the box on ‘Italy’s *scala mobile*’).

Italy’s *scala mobile*

In Italy, the current economic situation awakens memories of the 1970s when an exogenous oil price shock caused high inflation and macroeconomic instability and eventually triggered an economic recession. Expansive monetary and wage policy had fuelled excess demand, and a wage–price spiral had made inflation persistent and hard to fight. Regarding the wage policy, the *scala mobile* (sliding scale) was the key problem, because it indexed wages to inflation: nominal wages were intended to rise at the same rate as inflation to guarantee stable real wages.

⁶⁴ H. Giersch, K.-H. Paqué and H. Schmieding, *The Fading Miracle. Four Decades of Market Economy in Germany* (Cambridge, MA: Cambridge University Press, 1992).



The higher oil prices had made European economies poorer overall and a loss of purchasing power among employees was also inevitable. The *scala mobile* prevented a real income loss in Italy, but institutionalised a wage–price spiral. Thus, a temporary inflation shock became persistent and inflation rates reached 21% in 1980 (Figure 2.3).

Figure 2.3 Change of consumer price index (national basis), year-on-year, in %, since 1970



Sources: European Commission; German Economic Institute (IW).

The costs of fighting inflation with a restrictive monetary policy were substantial, because high interest rates were required to rein in excess demand. The outcome was a decade of economic turmoil that culminated in two severe crises in 1974 and 1976⁶⁵ with rising unemployment, production outages, and political and social unrest, as well as high public deficits and rising public debts. Italy is still burdened by high public debts to this day.⁶⁶ Currently, the public debt-to-GDP ratio stands at roughly 150%.

⁶⁵ R. Lubitz, *The Italian Economic Crisis of the 1970's*, International Finance Discussion Papers no. 120 (1978).

⁶⁶ J. Boysen-Hogrefe and K.-J. Gern, *Der italienische Schuldenberg – Ursachen und Schlussfolgerungen*, Kiel Policy Brief no. 45 (2012).



2.6 Costs of disinflation

On top of these effects of inflation on economic activities and positions, the costs of disinflation also have to be taken into account.⁶⁷ These costs occur when the path back to price stability is taken after a period of high inflation. The costs of disinflation mainly stem from the impact of higher interest rates and a more restrictive monetary policy, which dampen the excess domestic demand that is usually the main cause of inflation in combination with an excessive expansion of the money supply. Depending on the specific situation, a recession might occur as a negative side-effect necessary to achieve a sufficient reduction in inflation. Thus, output losses and higher unemployment, the adjustment burdens of disinflation, are the main costs.

Macroeconomic modelling of the costs of disinflation yields varying results that largely depend on the assumed macroeconomic model. Keynesian models featuring sticky prices tend to indicate high costs of disinflation, while more classical models assuming flexible prices tend to predict lower costs of disinflation.⁶⁸ Moreover, the sacrifice ratio that measures the output loss from reducing inflation by 1% differs substantially between countries and can be thought of as an indicator for structural differences. Estimates of output losses for selected European countries in the period 1972–2003 range from 0.23% of GDP for Finland to 2.07% for Luxembourg and hint an average of 0.57% of GDP cumulatively over the five years following the reduction of inflation. These results exhibit, however, significant variance over time and strong dependency on the inflation environment.⁶⁹ Other estimates suggest a sacrifice ratio for the euro area of between 1.2% and 1.4% for the period 1985–2004.⁷⁰ Moreover, the example of the US in the early 1980s is worth considering (see the box ‘US: Disinflation under Paul Volcker’). While scholars disagree over the exact costs of disinflation, many studies suggest that they are considerably lower than the costs of inflation⁷¹ and that the benefits of disinflation outweigh those of inflation.⁷²

⁶⁷ Fischer, Sahay and Vegh, ‘Modern Hyper- and High Inflation’.

⁶⁸ D. Croushore, ‘What Are the Costs of Disinflation’, *Business Review Federal Reserve Bank of Philadelphia* (1992).

⁶⁹ J.-J. Durand, M. Huchet and J. Licheron, ‘Sacrifice Ratio Dispersion Within the Euro Zone: What Can Be Learned About Implementing a Single Monetary Policy’, *International Review of Applied Economics* 22/5 (2008), 601–21.

⁷⁰ J. Coffinet, J. Matheron and C. Poilly, ‘Estimating the Sacrifice Ratio for the Euro Area’, Banque du France, *Quarterly Selection of Articles* 8 (2007), 35–48.

⁷¹ K. Dowd, ‘The Costs of Inflation and Disinflation’, *Cato Journal* 14/2 (1994), 305–31.

⁷² C. S. Hakkio and B. Higgins, ‘Costs and Benefits of Reducing Inflation’, *Economic Review*, January 1985.



US: Disinflation under Paul Volcker

Paul Volcker, chairman of the US Federal Reserve Board from 1979 to 1987, successfully fought the high levels of inflation persisting in the US since the 1970s that had been caused by oil price shocks and expansive macroeconomic policies. With inflation reaching 11% in June 1979, Volcker saw an urgent need to react, as he was convinced that further inflation would create grave economic problems. Under his chairmanship, the Federal Reserve implemented restrictive policies targeted directly at money supply and indirectly at interest rates.

Important to the success of this strategy was regaining credibility among the public that the Federal Reserve was really determined to fight inflation. In Volcker's words: '[F]ailure to carry through now in the fight on inflation will only make any subsequent effort more difficult.'⁷³ Previously, the Federal Reserve had cautiously raised interest rates only to lower them again as soon as output losses materialised. This approach had not only not been able to seriously dent inflation rates, but had contributed to even higher levels of inflation.

The successful reduction of inflation under Paul Volcker came at the cost of a considerable economic downturn.⁷⁴ The 1981–2 recession resulted in an unemployment rate of almost 11% by the end of 1982, the highest since the Second World War. However, this contraction was only short-lived. As inflation fell to 5% by the end of 1982, the Federal Reserve lowered the federal funds rate and enabled economic recovery, leading to unemployment falling back by three percentage points within a year, while inflation remained at around roughly 4% throughout the 1980s.⁷⁵

The Volcker disinflation process serves to illustrate several important aspects of disinflation. First, the costs of inflation should also include the subsequent costs of disinflation. Once the credibility of the central bank is lost, and inflation expectations rise as a result, it is not easy to regain credibility. The uncompromising commitment of the central bank to fighting inflation appears crucial to reining in high inflation expectations. Nevertheless, the costs of disinflation appear to be relatively short-lived and smaller than the costs of ongoing inflation in the short and long term.

⁷³ *Federal Reserve History*, 'Recession of 1981–82, July 1981–November 1982' (2013).

⁷⁴ Sachs and Larrain, *Macroeconomics in the Global Economy*, 460.

⁷⁵ *Federal Reserve History*, 'Recession of 1981–82'



The influence of inflation on public debt sustainability

3.1 Theoretical effects

Inflation has been shown to negatively influence the economy in numerous ways (Section 2). The current inflationary environment will also affect public debt sustainability. The extent to which this occurs depends on several effects.⁷⁶

Regarding the existing stock of public debts and the pre-existing interest rate burden, inflation is expected to decrease their real value.⁷⁷ In other words, if debts and interest rates are fixed in nominal terms and if higher prices lead to higher incomes, it becomes easier to service and repay a given nominal debt burden (see also Section 2.4).

Moreover, inflation also affects the need to raise new public debts, as it is likely to affect the difference between current government revenues and expenditures. If public revenues increase more (less) than expenditures, the fiscal balance improves (deteriorates), and the government has to take on less (more) new public debt. Inflation increases nominal government revenues as the nominal value of the tax base tends to rise (see Section 2.4). However, inflation also raises nominal government expenditures. For example, the wages of public sector employees are likely to increase faster to compensate for inflation-induced losses of purchasing power; goods and services purchased by the government become more expensive; and the interest burden may rise, particularly if inflation-related risk premiums should increase (see below). Whether public revenues or expenditures rise more, is a priori unclear. It largely depends on the composition of both financial flows and whether one or other of them is more susceptible to inflation.

⁷⁶ Sachs and Larrain, *Macroeconomics in the Global Economy*, 327; A. Nastansky, 'Wechselwirkung zwischen Inflation, Staatsverschuldung und Geldpolitik', *Wirtschaftswissenschaftliches Studium* 42/5 (2013), 251–6; B. Akitoby, T. Komatsuzaki and A. Binder, *Inflation and Public Debt Reversals in the G7 Countries*, IMF, Working Paper no. WP/14/96 (Washington, DC, 2014); C. M. Reinhart and M. B. Sbrancia, *The Liquidation of Government Debt*, IMF, Working Paper no. WP/15/7 (Washington, DC, 2015).

⁷⁷ K. Junius and K. Tödtmann, 'Inflation und Staatsverschuldung', *ifo Schnelldienst* 63/17 (2010), 16–26.



Regarding the development of the debt-to-GDP ratio, measured as nominal debt relative to nominal GDP, the effect of inflation on nominal GDP also comes into play. Even if the level of nominal public debts should increase, the debt-to-GDP ratio might decline if nominal GDP rises more (see below).

In the following it is examined how increased inflation and the related effects on the growth rates of nominal and real GDP and on nominal interest rates will influence the debt-to-GDP ratio and thus public debt sustainability in the coming years.

3.2 Empirical simulations

3.2.1 Framework for public debt sustainability analysis

The core of the following debt sustainability analysis is formula (4). This formula describes the debt-to-GDP ratio (DR) in year t —in other words, public debt in year t relative to nominal GDP in year t —with the following determinants:⁷⁸ the average nominal interest rate on public debt (i), the growth rate of nominal GDP (g), the debt-to-GDP ratio of year $t-1$ and the primary fiscal surplus as a share of GDP (PS) in year t . The primary fiscal balance is calculated as the difference between primary government expenditure (excluding interest expenditure) and government revenues.

$$④ \quad DR_t = \left(\frac{1+i}{1+g} \right) DR_{t-1} - PS_t$$

The following examples illustrate how the individual variables influence the debt-to-GDP ratio:

- If the nominal interest rate and the growth rate of nominal GDP are equal, the debt-to-GDP ratio in year t is the difference between the debt-to-GDP ratio in year $t-1$ and the primary surplus in year t . The change in the debt-to-GDP ratio between $t-1$ and t is thus the primary surplus. If the primary balance is positive (negative), the debt-to-GDP ratio falls (increases).

⁷⁸ J. Gottschalk, *Fiscal and Debt Sustainability*, Fiscal Analysis and Forecasting Workshop (Bangkok, 2014); J. Matthes, *Schuldenerleichterungen für Griechenland?! Anforderungen, Optionen und Wirkungen*, IW, Policy Paper no. 25 (Cologne, 2015); J. Matthes, *Wie tragfähig sind die Staatsschulden der vormaligen Krisenländer in Südeuropa? Analyse und Empfehlungen*, IW, Report no. 32 (Cologne, 2017); B. Kauder, 'Wie entwickeln sich die Staatsschulden in den südlichen EU-Mitgliedstaaten?', *IW-Trends* 48/4 (2021), 79–98.



- If the nominal interest rate exceeds the growth rate of nominal GDP, the public debt-to-GDP ratio increases (assuming that the primary surplus is smaller than or equal to zero). To stabilise the debt-to-GDP ratio, a sufficiently high primary surplus is needed, with its extent depending on the difference between the growth rate of nominal interest rates and of nominal GDP growth and on the existing debt burden (DR_{t-1}). The higher the existing debt burden, the larger the effect. This is one of the key reasons why high public indebtedness makes countries vulnerable to higher interest rates.
- If the growth rate of nominal GDP exceeds the nominal interest rate, the debt-to-GDP ratio decreases (assuming that the primary surplus is larger than or equal to zero). In this case, a primary deficit is possible without increasing the public debt ratio. Thus, the higher the growth rate of nominal GDP (relative to that of the interest rate), the less fiscal consolidation is needed.

A higher inflation rate raises the growth rate of nominal GDP and thus would lower the debt-to-GDP ratio if the other variables remain unchanged. However, it is likely that a higher inflation rate would induce changes to some of the other determinants of debt sustainability:

- The price component of nominal GDP growth—the so-called GDP deflator—increases with inflation, but may not do so to the same degree as consumer prices. The GDP deflator measures the price development of all components of GDP and not only the prices of private consumption.
- The other component of nominal GDP—the real growth rate of GDP—may, however, be negatively affected by higher inflation due to, among other effects, inflation being harmful for factor allocation and the endowment of factors of production (Section 2).
- Nominal interest rates are likely to rise due to inflation, in accordance with the aforementioned Fisher effect. The ECB will raise short-term interest rates to ensure price stability. Moreover, investors will attempt to (partially) hedge against inflation losses on their medium and longer-term claims too by means of higher interest rates on the financial market for government bonds of longer duration. Furthermore, interest rates may rise sharply due to risk premiums when investors are concerned about public debt sustainability.



Against this background the following somewhat simplifying assumptions are made to keep the following simulations sufficiently understandable:

- It is assumed that the inflation and nominal interest rates on the financial market increase simultaneously at the same pace. This assumption reflects the Fisher effect,⁷⁹ according to which an increase of the inflation rate translates one-to-one into an increase in the nominal interest rate. In reality, the rise in market interest rates might initially lag behind the increase in inflation. This would induce an even larger debt reduction as displayed in our simulations. We also consider the important distinction between market interest rates and the average nominal interest rate of the public debt burden in Formula (4). In reality, the average interest rate of the debt burden will not rise as fast as market interest rates. This would only be true if the entire public debt was maturing today. However, public debt has an average term to maturity of about 7.5 years (which is also assumed for all countries in this analysis).⁸⁰ When public debt matures it is usually refinanced through newly issued debts for which the higher market interest rates become relevant. Thus, higher market interest rates take time to feed into the public debt stock. Thus, the slower increase of $1 + i$ relative to the increase of $1 + g$ causes a decreasing debt-to-GDP ratio in Formula (4). That is why highly indebted countries prefer inflation more than countries with low levels of public debt.
- A constant primary surplus is assumed, as it is unclear whether inflation will increase public revenue more than public expenditure (as pointed out above).
- The extent to which inflation and the real growth rate of GDP vary is altered, assuming that a rise in inflation translates fully into a rise in the price component of nominal GDP.

Against this background, four illustrative inflationary scenarios describing how debt-to-GDP ratios may evolve in the upcoming years are developed. We will compare these four scenarios with a reference scenario that uses original figures from the International Monetary Fund (IMF) and the European Commission.

⁷⁹ Fisher, *The Theory of Interest*.

⁸⁰ OECD, *OECD Sovereign Borrowing Outlook 2022* (Paris: OECD Publishing, 2022).



Table 3.1 Scenarios for sustainability analysis

<p>Scenario 1</p> <p>A moderate increase of inflation (and hence of the growth rates of nominal GDP) and nominal interest rates of 2 percentage points</p> <p>No change in the growth rate of real GDP</p>	<p>Scenario 2</p> <p>A more severe increase of inflation (and hence of the growth rates of nominal GDP) and nominal interest rates of 5 percentage points</p> <p>No change in the growth rate of real GDP</p>
<p>Scenario 3</p> <p>A moderate increase of inflation (and hence of the growth rates of nominal GDP) and nominal interest rates of 2 percentage points</p> <p>The increasing inflation (or a deteriorating geopolitical environment) is harmful for the growth of real GDP (we correct the growth of nominal GDP by -0.5 percentage points)</p>	<p>Scenario 4</p> <p>A more severe increase of inflation (and hence of the growth rates of nominal GDP) and nominal interest rates of 5 percentage points</p> <p>The increasing inflation (or a deteriorating geopolitical environment) is harmful for the growth of real GDP (we correct the growth of nominal GDP by -1.5 percentage points)</p>

Note: Scenarios 3 and 4 imply that the harmful effect of increasing inflation on GDP increases more than proportionally with inflation: the variables increase by a factor of 2.5 (from 2 to 5) and the harm to GDP increases by a factor of 3 (from 0.5 to 1.5).

The resulting matrix (Table 3.1) illustrates the four inflationary scenarios.⁸¹ Two of the scenarios assume that inflation (and thus the growth rates of nominal GDP and nominal interest rates) increases moderately by two percentage points above the level predicted by the IMF and the European Commission; two further

⁸¹ For a detailed discussion of possible inflation effects and a related analysis for G7 countries, see Akitoby, Komatsuzaki and Binder, *Inflation and Public Debt Reversals in the G7 Countries*.



scenarios assume a severe increase of five percentage points.⁸² On top of that, two scenarios assume that the growth rates of real GDP turn out to be smaller than those predicted by the IMF and the European Commission, while two scenarios do not expect such a negative effect.

Scope of analysis and data

We focus on how public debt develops in France, Germany, Greece, Italy, Portugal and Spain. The motivation for using this set of countries is to include both the four biggest economies in the EU (Germany, France, Italy, Spain) and the five member states showing the highest debt-to-GDP ratios. All six member states except Germany show debt-to-GDP ratios of more than 100%. We project how public debt develops in a five-year horizon until 2027.

The debt sustainability analysis uses the most recent data from the IMF World Economic Outlook Database (published in April 2022). This database includes estimates for the recent and the current year as well as projections for the years until 2027.⁸³ The variables we use are the debt-to-GDP ratios, the growth rates of nominal GDP and the primary surpluses. For the average interest rate on public debt, we use the AMECO Database of the European Commission, featuring the Spring 2022 Economic Forecast.⁸⁴ The data on average interest rates is not available up to 2027. For our reference scenario, we thus assume the projected 2023 interest rates of the individual member states will remain constant until 2027. In the case of higher or further rising market interest rates after 2023 this could underestimate the average interest rate and thus also the debt-to-GDP ratio to some extent.

In our individual scenarios, we use the data from the IMF and the European Commission as the starting point. For example, if the IMF's projection for the 2025 growth rate of nominal GDP is 2.5% and the European Commission's projection for the average nominal interest rate is 1.5%, in scenario one we use a growth rate of nominal GDP of 4.5% and a nominal interest rate (only on newly issued public debt) of 3.5%.

⁸² The IMF predicts that growth rates of nominal GDP will decline in the period 2022–7 from 5.0% to 3.1% in France, from 7.0% to 3.2% in Germany, from 9.3% to 3.1% in Greece, from 4.0% to 2.6% in Italy, from 7.0% to 3.6% in Portugal and from 6.9% to 3.4% in Spain.

⁸³ IMF, *World Economic Outlook Database* (April 2022).

⁸⁴ Published in May in *European Commission*, 'Macro-Economic Database AMECO' (2022).



Increasing interest rates will certainly reduce inflation after some time. Later, with reduced inflation rates, interest rates may in turn be lowered again. Given the short- to medium-term horizon of this study, we abstract from these effects to some extent.

3.2.2 Simulation results

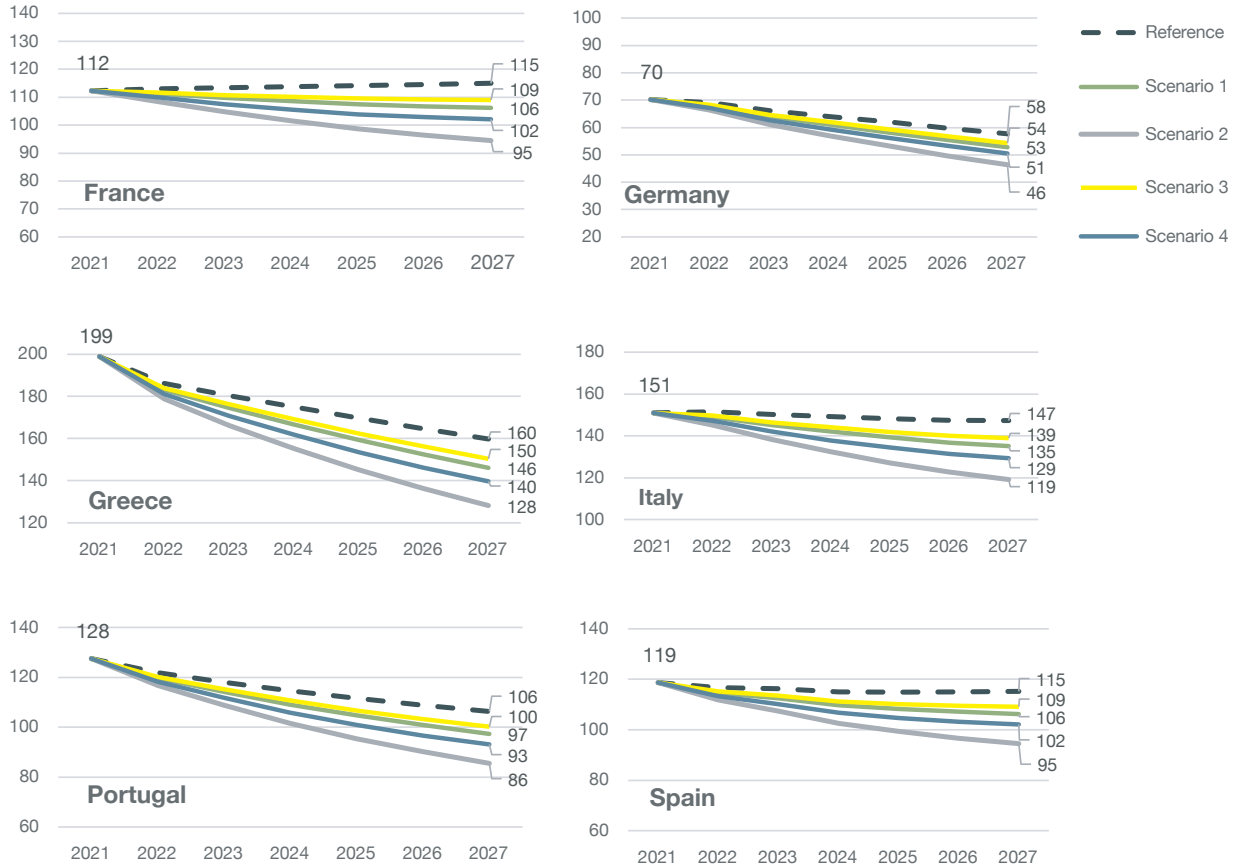
France

In absolute values, France has the highest public debt in the EU. Figure 3.1 shows how public debt in France may evolve until 2027. The reference scenario shows this development based on the IMF's and the European Commission's projections. This projection expects the debt-to-GDP ratio to increase from 112% to 115%, which is the only increase among the member states we consider in this study. While interest rates are relatively low and projections for real GDP are moderate, the primary balance is the poorest in our sample of member states.

The most optimistic scenario in terms of public debt is scenario two. Here we assume that inflation, the growth rates of nominal GDP and the nominal interest rates are persistently five percentage points higher than the IMF and the European Commission predict. The results indicate that the debt-to-GDP ratio would decrease to 95% by 2027. If we reduce the growth rates of nominal GDP by 1.5 percentage points due to the high-inflation environment or an unfavourable geopolitical situation, the debt-to-GDP ratio would still fall significantly to 102% (scenario four). Less optimistic, but still positive for public debt, are scenarios one and three, with a moderate increase of inflation, and growth rates for nominal GDP and nominal interest rates of two percentage points beyond official projections. Dependent on whether it is an increase in inflation or a deteriorating geopolitical environment that negatively affects the growth rates of nominal GDP (by 0.5 percentage points), the debt-to-GDP ratio would decline to 106% (scenario one) or 109% (scenario three).



Figure 3.1 Projections of the debt-to-GDP ratio (in %)



Sources: European Commission; IMF; German Economic Institute (IW).

Note: Reference scenarios based on projections of IMF and European Commission; scenarios 1–4 with varying assumptions regarding inflation, growth rates of nominal GDP and nominal interest rates (see Table 3.1).



Germany

Among the member states examined, Germany has the lowest level of public debt. Figure 3.1 illustrates how public debt may develop in Germany over the coming years. Starting from a debt-to-GDP ratio of 70% in 2021, the reference scenario based on data from the IMF and the European Commission suggests a decline in the ratio to 58% in 2027. The reason for this is that the reference scenario expects a primary surplus as of 2024 and very low interest rates, while the outlook for the growth of real GDP is moderate.

As in the case of France, scenario two reduces public debt in Germany most significantly, to 46% in 2027. Should nominal GDP suffer in the new situation, the debt-to-GDP ratio would decline somewhat less to 51% (scenario four). The two more moderate scenarios would reduce the debt-to-GDP ratio to only slightly below the level of the reference scenario, to 53% (scenario one) or 54% (scenario three).

Greece

The member state with the highest debt-to-GDP ratio is Greece. In 2021, the debt-to-GDP ratio amounted to 199%. The projections of the IMF and the European Commission in Figure 3.1 indicate that the ratio would decline to 160% by 2027 (reference scenario). This is the most significant reduction among the member states considered. Greek interest rates are very low, as the European Stability Mechanism holds a large share of Greek bonds. The outlook for the primary balance is the most positive among the member states we consider and the growth prospects are also quite good.

This corroborates that highly indebted countries benefit most from a regime with high inflation rates. In the most optimistic scenario (scenario two), the Greek debt-to-GDP ratio would decline massively, to 128% in 2027. Even if there was a deteriorating geopolitical situation or negative repercussions for GDP growth (scenario four), the debt-to-GDP ratio would still decline to 140%. In the more moderate environment, the debt-to-GDP ratio would decline to 146% (scenario one) or 150% (scenario three).



Italy

Next to Greece, Italy is the country with the highest debt level in the EU. In 2021, the debt-to-GDP ratio amounted to 151%. The reference scenario, based on the projections of the IMF and the European Commission, suggests a quite moderate decrease in the debt-to-GDP ratio to 147% by 2027 (Figure 3.1). Italy pays by far the highest interest rates in our sample, has poor growth prospects⁸⁵ and also has a primary deficit predicted for the entire period until 2027.

The figure offers another piece of evidence for the beneficial effects of inflation for highly indebted countries. In scenario two, the Italian debt-to-GDP ratio would decrease significantly to 119%. In the case of negative repercussions for GDP growth, the reduction in the debt-to-GDP ratio would be smaller, with a resulting ratio of 129% (scenario four). In the moderate scenarios, the ratios would also be reduced to 135% (scenario one) and 139% (scenario three) in 2027.

Portugal

Figure 3.1 also shows the possible development of public debt in Portugal. In 2021, the debt-to-GDP ratio was 128%. All scenarios indicate a significant decline in the debt-to-GDP ratio. In the reference scenario, based on the IMF's and the European Commission's data, the debt-to-GDP ratio would decline to 106% by 2027. This is the second largest reduction across the member states considered and can be attributed to a positive projection for the primary balances and a good projection for growth in real GDP, and is in spite of the relatively high interest rates.

The alternative scenarios are even more optimistic regarding public debt. In scenario two, the debt-to-GDP ratio would decline to 86%. When it is assumed that there are negative repercussions as a result of the new environment, the debt-to-GDP ratio would still decline to 93% (scenario four). Even in the more moderate scenarios, the debt-to-GDP ratio would still decline significantly by 2027, to 97% (scenario one) or to 100% (scenario three).

⁸⁵ See B. Busch, *Die italienische Misere. Ökonomische Strukturprobleme und wirtschaftspolitische Herausforderungen*, IW, Analysis no. 131 (Cologne, 2019).



Spain

In 2021, the debt-to-GDP ratio in Spain amounted to 119%. This is the lowest value among the southern member states in this study and is only slightly higher than the French value. Figure 3.1 illustrates the individual scenarios. The reference scenario, based on data from the IMF and the European Commission, suggests that the debt-to-GDP ratio would decline moderately to 115% by 2027. The reason for this being only a small decline is that Spanish interest rates are relatively high and that the outlook regarding primary balances is quite negative. Without good projections for growth rates in real GDP, the reference scenario would certainly indicate an increase in the debt-to-GDP ratio.

However, the alternative scenarios indicate that Spain also benefits from a regime with high inflation. In scenario two, the debt-to-GDP ratio would decline to 95%. In the case of adverse effects under this regime, the debt-to-GDP ratio would still reduce to 102% (scenario four). In the more moderate scenarios, the debt-to-GDP ratio would decline by 2027 to 106% (scenario one) or 109% (scenario three).

3.3 Interim conclusion

The debt sustainability analysis has shown that inflation tends to help reduce the public debt-to-GDP ratio in the short to medium term under specific conditions. An important reason for this is that nominal economic growth and nominal interest rates drive the debt-to-GDP ratio (aside from the fiscal balance). While inflation increases both nominal market interest rates and nominal economic growth (with real economic growth assumed constant for the moment), it is mainly the different timing of the impact of inflation and average nominal interest rates on the public debt that causes inflation to reduce debt-to-GDP ratios. While the increase in nominal economic growth directly reduces the public debt ratio, the increase in nominal average interest rates, by contrast, sets in only gradually. It is only newly issued public debt that is associated with increased interest rates. Given that government bonds have terms of maturity of about 7.5 years on average, it takes quite some time until increased interest rates fully impact on public debt.

However, it has to be taken into account that higher inflation will also tend to reduce real economic growth, as pointed out in Section 2.5, so the impact of inflation on nominal economic growth is not clear a priori. The detrimental distributional effects related to the creditor–debtor thesis—that is, the loss of the



income of creditors due to declining real interest rates and the devaluation of their asset position (Section 2.3)—are generally not considered in debt sustainability analyses. But they are, of course, highly relevant, as inflation tends to benefit the government at the expense of its private creditors and savers.

Notwithstanding these qualifications, the above calculations provide relevant results. In the set of member states examined and under the assumptions made here, France, Italy and Spain barely reduce their debt-to-GDP ratios in the reference scenario. For these member states, we project significant reductions in their debt-to-GDP ratios as a result of higher inflation. However, the examples of Germany, Greece and Portugal indicate that reducing public debt is also feasible in regimes of lower inflation.

Going beyond the scenarios discussed here, in the longer run persistently higher inflation could also increase the public debt ratio. This is true if very high market interest rates were needed to bring inflation down. These high interest rates could reduce real GDP growth more than assumed here. What is more, if inflation (and thus market interest rates) remained high for an extended period of time, this would lead to a longer lasting increase in average interest rates on public debts. With a higher interest rate, public debt sustainability could be endangered in countries with high public debts if inflation only reduces again after a longer time. In this case, a combination of relatively low inflation and relatively high average interest rates would be the key problem, as it would take considerable time to reduce the average interest rate again due to the maturity structure of public debts. This would essentially lead to the opposite situation compared to today. In such an environment the need for fiscal consolidation would increase significantly in order to keep public debts sustainable. If sufficiently high primary surpluses are not politically viable over an extended period, this could make public debts unsustainable. Thus, while high inflation is detrimental for the economy in general in the short term (Section 2), public debt sustainability would also be negatively affected if inflation were to be reduced only after a longer period of time. To prevent such a scenario, inflation needs to be brought down again rapidly.

If this were to happen, there would be no reason for serious concerns about public debt sustainability. The rise in market interest rates would remain limited and would not last for long. In this scenario average interest rates on public debts could remain relatively low, despite a certain, but limited increase, albeit from a very low level. If governments remain committed to a stability orientation, public debt sustainability will not be endangered. Moreover, the need for fiscal consolidation would remain moderate. Financial markets would thus have no fundamental reason to raise risk premiums.



Conclusions and policy recommendations

4.1 Conclusions

Current high inflation rates pose a significant economic problem, particularly if they should prove to normalise more slowly than expected. At levels of more than 8% in the late summer of 2022, price increases are likely to damage prospects for economic growth in developed countries according to empirical estimates analysing past periods of inflation. In Section 2, the various potential detrimental effects of higher inflation rates were explained. In particular, distorted allocative effects are relevant in this respect, as high inflation rates impede the signalling function of the price system in a market economy.

Moreover, distributional effects are a major concern as more vulnerable groups of society are particularly affected by high inflation if increases in wages and interest rates lag behind price rises. Moreover, poorer households are especially vulnerable as they spend a larger share of their incomes on essential goods.

Policymakers should also be concerned because inflationary pressures are likely to mount in the medium term, that is, in the current decade. Demographic trends and the resulting labour shortages, deglobalisation and geopolitically motivated relocations and public spending, as well as decarbonisation and energy scarcity will likely lead to rising costs and price increases in the medium term. Only digitalisation has the potential to reduce inflation, but it is not clear how far this potential will be realised. As demographic trends and possibly also deglobalisation will also tend to reduce economic growth, there is a risk that higher inflation and lower growth will lead to stagflation tendencies in the medium to long term.⁸⁶

One of the largest current dangers that may cause higher inflation to become more persistent is the potential for a wage–price spiral. While it is understandable that employees will try to strive for higher wages,

⁸⁶ M. Demary and M. Hüther, 'How Large Is the Risk of Stagflation in the Eurozone', *Intereconomics* 57/1 (2022), 34–9.



companies cannot make up for the losses in purchasing power as they also face higher input costs and will have difficulty passing these on in higher sales prices in an environment of weaker economic growth—thus leading to likely decreases in firms' profits. In times of supply and commodity shocks as triggers of higher inflation rates, care must therefore be taken to avoid second-round effects via price–wage–price spirals. Commodity shocks must not be amplified by further labour cost shocks. In this situation, there is no domestic distributional space, rather there is an outflow of income to commodity-exporting countries (see also the box on 'Italy's *scala mobile*' and the problematic experiences of the 1970s).

To prevent a wage–price spiral, it is thus high time for macroeconomic coordination between different policy actors. Monetary policy should focus on targeting price stability (see Section 4.2 below) while wage and fiscal policy should support monetary policy with this objective. Wage negotiation outcomes should include one-off payments by companies on top of normal wage increases to target purchasing power losses, but at the same time should avoid long-term increases in wage costs. Fiscal policy should make one-off payments attractive for companies and employees by allowing generous tax deduction possibilities.

In the following, due to the required brevity, focused policy recommendations are provided for monetary and fiscal policy.

4.2 Monetary policy recommendations

The ECB faces a difficult task as current inflation in the euro area is exclusively a supply-side phenomenon and a more restrictive monetary policy would only tackle the demand side, rather than the disruptions that have mainly caused the price increases via supply-chain problems and energy scarcities.⁸⁷ Nevertheless, the ECB needs to act in a determined way for several reasons:

- The ECB needs to signal its willingness to stick to its price stability mandate to keep inflation expectations under control. As the monetary policy stance was ultra-expansionary until the summer of 2022, there is room for moderate interest rate increases without rendering monetary policy restric-

⁸⁷ B. Kauder and T. Obst, 'Die EU unter Reformdruck: Geld- und Fiskalpolitik im Schatten der Krisenbekämpfung und Stagflation', *ifo Schnelldienst* 75/6 (2022), 5–9.



tive in a meaningful way. In this context and by comparison, it is noteworthy that shortly before the outbreak of the financial crisis in 2008 the main refinancing rate of the ECB stood at 4%, with inflation rates lower than 5% in roughly half of the EU27 member states.

- If wage–price spirals are set in motion in the euro area, the ECB will have to raise interest rates even more forcefully.
- The higher public and private investment needed for the digital and energy transformation in the near future should not be meaningfully affected by moderately higher interest rates. At the same time, a more balanced monetary policy stance could contribute to preventing an overheating of investment demand if economic conditions should improve in the case of a possible end to Russian military aggression in Ukraine.
- Higher interest rates could also contribute to preventing asset price bubbles on financial markets. These may be caused by a search for yield by investors in reaction to the extremely low interest rates that were prevalent until the summer of 2022. While the former ultra-expansionary monetary policy failed to raise persistently low inflation before the coronavirus crisis, it provided incentives to invest in higher yielding, but riskier assets and thus caused asset price inflation in certain markets, for example, property markets.
- The ECB should not succumb to fiscal dominance by targeting public debt sustainability more than price stability. This would imply giving up its independence.
- If the ECB fails to raise monetary policy–related short-term interest rates, this would by no means be a guarantee that longer-term interest rates would also remain low. In fact, the opposite could even be the case. The more financial actors fear high future inflation, the higher the inflation risk premium demanded in the financial market for longer-term investments, and thus also longer-term interest rates, will be. This applies, providing that the ECB significantly reduces its bond market purchasing programmes as indicated. A failure of the ECB to raise interest rates could thus induce even higher long-term interest rates. A decisive monetary policy stance that ensures the ECB’s credibility and prevents longer-term inflation expectations from rising too much is thus also an important tool to prevent larger increases to longer-term interest rates.



4.3 Fiscal policy recommendations

Fiscal policy should facilitate the objective of monetary policy to target inflation while minimising the impact on economic growth. This can be achieved by several means:

- To reduce the danger of a wage–price spiral, fiscal policy should strive to limit the impact of extreme price rises. It should target those members of society most affected by the higher prices of essential goods such as energy and food until inflation decreases again. In contrast, general and broad-based expenditure increases or tax reductions for an extended period of time carry the danger of overburdening governments. Price interventions should be the very last option, as they reduce the incentive to reduce the demand for the higher priced goods and thus do not allow for the signalling power of prices regarding scarcity.
- Fiscal policy needs to focus on smart fiscal consolidation⁸⁸ in order to reduce public debt levels again while minimising impacts on economic growth. Tackling public debt sustainability is essential to free the ECB from the threat of fiscal dominance. It has been shown that, under certain conditions, inflation can reduce the public debt burden. At the same time, however, the associated distributional effects—the loss of income of creditors as a result of declining real interest rates and the devaluation of their asset position—must also be taken into account.
- The Stability and Growth Pact should be viewed as an essential tool for EU countries with high public debts to signal to financial markets a clear commitment to reducing public debt levels in a growth-friendly way. To achieve this aim, the Pact will need to be reformed to a limited degree, especially in terms of extending the time permitted to reduce the debt level to 60% of GDP for highly indebted countries.⁸⁹

⁸⁸ G. Kolev and J. Matthes, 'Smart Fiscal Consolidation: A Strategy for Achieving Sustainable Public Finances and Growth', *European View* 12/2 (2013).

⁸⁹ B. Busch and B. Kauder, *Der Stabilitäts- und Wachstumspakt: Bestandsaufnahme und Vorschläge für mehr fiskalpolitische Disziplin in Europa*, IW, Analysis no. 142 (Cologne, 2021); J. Matthes, *Stabilität statt staatlicher Überforderung. Empfehlungen für eine Reform des Stabilitäts-Wachstumspaktes*, IW, Policy Paper no. 1 (Cologne, 2022).



- To make fiscal policy more growth-friendly, EU member states should critically review their public expenditure and revenue structure. Moreover, growth-enhancing structural reforms should be prioritised, and this is also the case in the context of the Recovery and Resilience plans. This would reduce the potential conflict for the ECB between targeting inflation and dampening economic growth.
- Due to the high inflation rates and supply-side constraints, it is currently not the right time for a fiscal demand stimulus.

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Although inflation has begun declining in Europe, core inflation levels continue to remain well above the 2% mandate of the European Central Bank (ECB). In fact, the current bout of inflation should continue to weaken as and when supply-chain disruption and energy shortages abate. However, there are also factors that will prevent a large and immediate decline in inflation as soon as these scarcities wane. As import and supply prices have risen very strongly in recent months, it will take some time for these price increases to feed through the value chains into the final consumption and consumer prices.

An additional risk for Europe's economy is the potential for a wage–price spiral. In fact, this represents the largest current danger as it could lead to high inflation becoming much more persistent. If trade unions force significant labour cost increases to keep real wages constant or even rising, renewed cost shocks would lead to new price pressures for firms and force them to increase their sales prices further. This would most likely lead to a wage–price spiral and would force the ECB to raise interest rates even more, thus increasing the costs of disinflation and the danger of a recession.

To prevent a wage–price spiral, it is thus high time for macroeconomic coordination between the various policy actors. Monetary policy should focus on targeting price stability, while wage bargaining and fiscal policy should support monetary policy in this objective. Even more important, fiscal policy should strive to limit the impact of the current large price increases by providing targeted income support for those members of society most negatively affected by higher inflation rates. In any case, due to high inflation rates and actual supply-side constraints, it is currently not the time for a fiscal stimulus via higher government expenditures.



Wilfried
Martens Centre
for European Studies

