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From past shocks to future uncertainties: navigating 25 years of euro area challenges

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From past shocks to future uncertainties: navigating 25 years of euro area challenges

Abstract

The euro area has been subject to a series of very different shocks, some of which, such as the COVID-19 pandemic, were unprecedented. While the ECB's reaction to these deflationary shocks was vigorous, it persisted too long with its expansionary measures and failed to see their inflationary impact when energy prices shot up. The future is likely to bring new challenges, but climate change might not be the most important threat to price and financial stability.

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LIST OF ABBREVIATIONS

APP	Asset purchase programme
ECB	European Central Bank
EP	European Parliament
ESM	European Stability Mechanism
ETS	Emissions trading system
EU	European Union
EVs	Electric vehicles
GDP	Gross domestic product
GFCs	Global Financial Crisis
HICP	Harmonised index of consumer prices
IC	information communications
OMT	Outright monetary transactions
PEPP	Pandemic emergency purchase programme
PSPP	Public sector purchase programme
SSM	Single supervisory mechanism
TFP	Total factor productivity

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EXECUTIVE SUMMARY

- **The main lesson from the first quarter century of the euro is that the past is a poor guide for the future**. The dominant source of shocks affecting the euro area has changed several times over this period.
- **Financial markets represented the main source of tension in the first 15 years**. A global credit boom, coupled with a profound asymmetry within the euro area when German unification happened, created first inflationary pressures and then deflationary when the crisis set in.
- **Only a few years after the financial crisis had been overcome, the COVID-19 pandemic created another unprecedented challenge, followed shortly by the sharp spike of energy prices triggered by the Russian invasion of Ukraine.**
- **The ECB was slow to recognise the challenge to price stability from the reopening of the economy after COVID-related lockdowns and the spike in energy prices.** That delay was compounded by maintaining an overly expansionary policy stance even after the recovery from the pandemic recession had taken hold.
- **The recent bout of inflation has confirmed the observation that the inflation process is asymmetric, with high rates of inflation much more likely than very low rates of inflation or deflation.**
- **Climate change will most likely remain as a pressing policy issue in the EU and at global level, with great uncertainty around the magnitude and timing of its potentially substantial economic cost.**
- **While climate-related physical risks are growing even in Europe, they should not necessarily lead to a systemic financial risk.** Physical risks are of a more long-run nature, likely to be localised and do not involve sectors with high leverage.
- **Similar reasoning applies to transition risk related to sudden increases in mitigation efforts.** The recent fourfold increase in the ETS emission certificate cost provided a useful stress test that did not reveal vulnerabilities.
- **The green transition and its interplay with digital transformation involves both synergies and challenges that go beyond the brown sectors.** Policies that target these sectors as a potential risk to financial stability might miss other challenges**.**

1. INTRODUCTION

Lessons learned from the past can help shape future policies. Nevertheless, it is important to recognise that the past is not always a perfect predictor of the future. In the context of the euro area, an analysis of the first 25 years of the euro clearly shows that the nature of the threats to price and financial stability has changed more than once. Moreover, new trends, technologies, and circumstances that may require adopting new approaches and adjustments to old strategies can always emerge.

This contribution starts with a broad-brush overview of the experience of the euro area so far. We distinguish two different episodes: the first 20 years, which were associated with the prominent historical event, the German reunification, and which set off a diverging path between Germany and the Southern European countries, as well as the global housing boom before the Global Financial Crisis (GFC); and the past 5 years when the euro area economy was challenged by two successive shocks that did not originate in the financial system: the COVID-19 pandemic and Russian invasion of Ukraine with its subsequent energy crisis.

We look into the developments of inflation during each period and discuss the implications of the events for price stability, as well as the response of the European Central Bank (ECB) to these developments in view of its inflation-targeting framework.

Looking ahead, climate-related risks, including physical and transition risks, have emerged as one of the biggest challenges of our time. In brief we discuss the possible transmission of these risks to the financial sector, and in particular the potential impact of the materialisation of these risks on financial stability in the euro area.

The rest of this paper is organised as follows. In Section 2, we describe the forces behind the main developments at the core of financial markets in the euro area during the first 20 years of the euro. In Section 3, we focus on the past five years and discuss the various shocks hitting the euro area economy and their implications for price stability, with a reflection on the ECB policy measures in response to these shocks. Section 4 touches upon the climate risks and potential challenges for the future of the euro area economy. Section 5 concludes.

2. THE FIRST 20 YEARS OF THE EURO

The first 20 years of the euro were characterised by a combination of two developments, the aftermath of German unification and an unprecedented global credit and housing boom, which predated the start of the third and final stage of Economic and Monetary Union (EMU) in January 1999 with the introduction of the euro as a single currency. Even a decade later, the asymmetric effects of unification were not muted and were indeed still strong because they originated from a sector that is subject to very long-lasting cycles, namely construction (Gros, 2009).

The first years of unification had led to a strong increase in consumption as East German wages were paid in Deutsche Mark and, more importantly, in construction activity, both in the public sector to modernise infrastructure in the new states and in the private sector as the federal government provided generous subsidies to facilitate improvement in the dilapidated East German housing stock. This boom faded when the Bundesbank sharply increased rates in 1995 to counter incipient inflationary pressures and public subsidies were reduced in the latter half of the 1990s. During the boom years, there had been so much construction that the demand for new housing turned down and remained weak for a long time (essentially until about 2005) (Belke and Gros, 2007). However, while Germany went into a long-lasting slump, most of the remainder of the euro area enjoyed a credit boom. When this credit boom ended in 2007-2008, many of the countries that had received large capital inflows suddenly had to adjust to the abrupt end to these flows.

There are many ways to illustrate the divergences that dominated the first decade of the euro and led to the crisis later on. Here we concentrate on two indicators, the financial cycle and the construction sector (since housing was at the heart of the Global Financial Crisis [GFC]).

2.1. Financial cycle divergences

As a common approach, statistical methods are used to identify the peaks and troughs in asset price or credit development that correspond to the expansion and contraction phases of the financial cycle.[1] Figure 1 shows the financial cycle using the adjusted real loans to households and the non-financial corporations (NFCs). It is apparent that up to about 2009 or 2010 the cycle of Germany was not aligned with those of the Southern countries that later experienced financial stress (Greece, Italy, Portugal and Spain). This pattern changed after 2015 when the credit cycle in Germany became mostly positively correlated with that of the Southern European countries.

[1] Here, an asymmetric Christiano-Fitzgerald filter, with drift adjustment, assuming an I(1) process, is applied. The filter was first introduced by Christiano and Fitzgerald (2003) to isolate the component of a time series that lies within a particular band of frequencies, making it suitable for analysing cyclical patterns in economic data.

Figure 1: Financial cycle components

Source: Authors' own calculations based on data from BIS, ECB, Eurostat.

Note: The time series were deflated using the GDP deflator. The cycles were extracted using bandpass filter with a frequency band of 32 to 80 quarters, implying that the financial cycle can last between 8 and 20 years. The y-axis – the cycles – represent percentage deviations from trend.

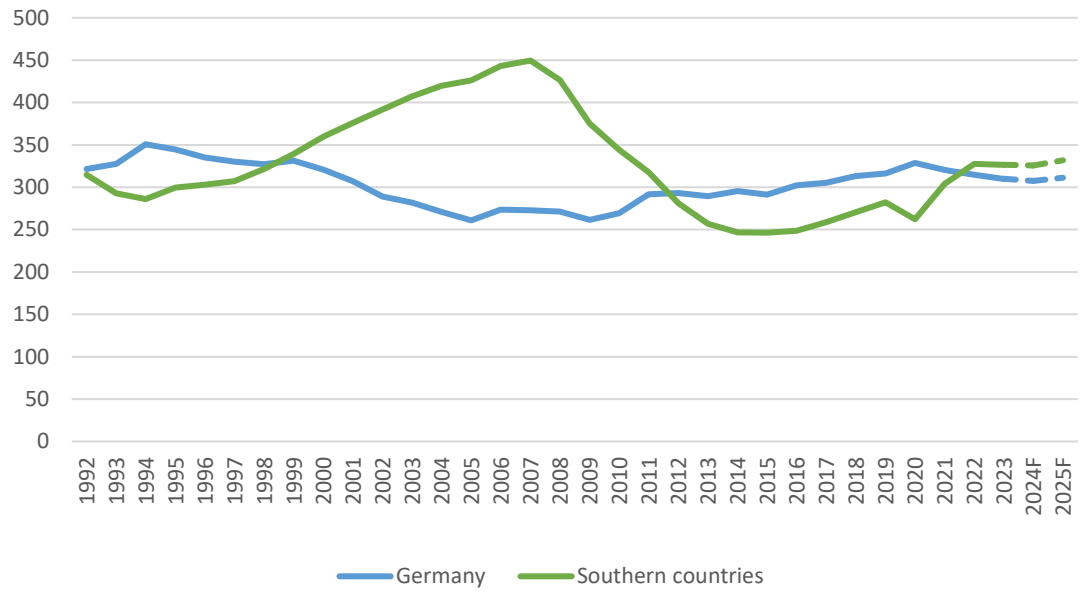
2.2. Construction and the financial cycle

As mentioned above, the construction sector was at the heart of the divergence between Germany and Southern European countries. The raw data can illustrate the trends.

Figure 2 below shows total spending on construction in Germany and the countries that later experienced tensions in their sovereign bond markets (i.e. Greece, Italy, Portugal and Spain). Up to the start of EMU the total spending of Germany was at around EUR 350 billion, roughly equal to that of the crisis countries combined. During the first 8-10 years of the euro this changed radically. German construction spending fell substantially, while in the crisis countries it increased by over one half, so

that in 2007, just before the bubble burst, construction spending in the crisis countries was, at over EUR 450 billion, twice that of Germany. The GFC then led to a sharp decrease in the crisis countries to close to one half of its peak level. At the same time, construction picked up again in Germany as interest rates there fell, whereas they increased in the crisis countries as the risk premium soared.

Figure 2: Divergence in construction activity: construction investment in Germany versus Southern European countries (billion EUR)



Source: European Commission, Ameco. The numbers for2024 and 2025, shown as dashed line, are forecast.

2.3. Domestic demand booms and competitiveness

The construction boom in the Southern European countries increased domestic demand, which led to tighter labour markets and higher wage demands. The loss of competitiveness of these countries was thus to a large extent the result of the real-estate boom, rather than an independent factor by itself. The fact that most of the loss of competitiveness of the crisis countries corrected itself once the boom turned into bust suggests that this interpretation is correct.

Construction investment is always very credit-intensive. Construction booms are thus usually accompanied by high rates of credit expansion. When the boom stops, construction activity can fall below the pre-boom level because housing has a long lifespan. Moreover, real-estate cycles tend to last much longer than the typical business cycle. In Figure 1, the year 1997 represents the turning point in the construction activity where in Germany the post-unification boom ended, whereas in the Southern countries of the euro area (the later crisis countries) the construction boom lasted for about 12 years (until 2007). This divergence with two large parts of the euro area going in opposite directions is unlikely to be repeated because the combination that triggered it, namely the German unification boom and the global credit bubble, are unlikely to materialise again in that combination (Sandbu, 2017).

Global credit bubbles might happen again, but the impact on the euro area will be very different without the asymmetric element of German unification.

The construction bust of the Southern countries was quicker than the boom, but it still lasted 8 years, that is, until about 2015. Interestingly, this year represents also the turning point in other components of the financial cycle, characterised here by periods of credit boom and tightening as illustrated in Figure 1.

As mentioned above, the boom phase of the credit bubble strengthened domestic demand as it increased upwards pressure on wages and prices everywhere, but particularly in the countries experiencing massive capital inflows. This put pressure on the euro area average with the result that inflation stayed close to the 2% target and increased briefly to over 3% in 2008, forcing the ECB to increase rates. The bursting of the bubble then led to weak demand and a strong fall in inflation. The boom and bust cycle thus rendered it more difficult for the ECB to maintain not only financial but also price stability.

Energy prices also played a role in the short-term evolution of (headline) inflation because energy and raw material prices increased trend-wise during the first decade of the euro, providing another inflationary shock. The price of oil often represents the overall movement in energy and raw material prices. Measured in euro, the oil price index Brent[2] more than tripled from below EUR 20 (per barrel) at the start of the euro, to over EUR 60 by 2006-2007.

After the start of the GFC, the oil price underwent extreme fluctuations (similar to those in 2022). Brent oil reached a peak of close to 90 euros in late 2008, then fell to below 40 euros at the bottom of the 2009 recession, only to recover to above 80 euros in 2011. These fluctuations had a significant impact on headline inflation, making it even more difficult for the ECB to read medium-term inflation developments.

2.4. Digesting the aftermath of the boom

Inflationary pressures abated suddenly once the construction/demand booms in the Southern European countries reversed. This was exacerbated by the pressure on public finances in those countries in which governments implemented fiscal adjustments that reinforced the already strong deflationary pressures coming from the collapse of private sector demand. The net result for the euro area was overall weak demand since Germany, and the other countries not subject to fiscal distress, did not undertake offsetting fiscal expansions.

The combination of weak demand and high debt fuelled a vicious cycle of increasing risk premia on public debt that at one point even threatened the existence of the euro area. Financial market tensions abated after the celebrated 'Whatever it takes' intervention of the President of the ECB, Mario Draghi, in the summer of 2012, later formalised by the Outright Monetary Transactions (OMT) programme of the ECB. But it took some time for financial market tensions to abate and reverse the competitive disequilibria that had arisen during the boom phase.

The years following the euro area financial or sovereign debt crisis of 2011-12 were thus characterised by the opposite problem of the previous period. The problem was no longer one of keeping inflation below 2%, but to prevent it from falling too far below that target and preventing deflation.

During this time, inflation was slow-moving and showing significant persistence, as one would expect given that wages and prices are usually assumed to be rigid downwards. This persistence of inflation was much higher in the euro area than in the US, whereas before the crisis, it was broadly similar across the Atlantic (Bonam et al., 2019). Moreover, total factor productivity (TFP) growth diverged across the Atlantic owing to weak investment and employment recovery in the euro area, as well as the faster adoption of ICT technologies in the US (Licchetta et al., 2022).

In the period after the onset of the sovereign debt crisis and shortly before the COVID-19 pandemic outbreak, the euro area economy was characterised by a combination of sluggish growth and muted inflation. With inflation rates persistently remaining (somewhat) below the target, although interest rates had been lowered to zero, the ECB, alongside other central banks in advanced economies,

[2] https://markets.businessinsider.com/commodities/oil-price/euro

resorted to massive bond buying (and other unconventional monetary policy instruments such as longer-term lending to banks) on an unprecedented scale.

ECB policy during this time was again heavily influenced by energy price fluctuations. As mentioned above, oil prices (measured by the Brent index) doubled from the low during the recession of 2009 and 2011. This movement of oil prices (and those of other raw materials) exacerbated the pressure on the Southern European countries already under financial stress because they deteriorated their terms of trade right at the moment when they had to improve their external balance because capital flows had suddenly stopped. For example, during 2010-2012, both Italy and Spain experienced a deterioration in their terms of trade that was equivalent to an income loss of over 2% of GDP. Other euro area countries also experienced a similar shock, but they were better placed to absorb it.

After 2012-2013 energy and raw material prices reversed direction, leading to a gain in the terms of trade for the euro area of an almost equivalent amount. However, the fall in oil prices lowered (headline) inflation even more, increasing the pressure on the ECB to find other ways to return inflation to target. The fall in oil prices was especially rapid in late 2014 and could be seen as the trigger for the decision to start the (Public Sector Purchase Programme) PSPP in early 2015. Headline inflation had dipped shortly below zero around this time, but recovered when oil prices stabilised.

There exists a large literature regarding the massive bond purchases of the ECB after 2015 that cannot be fully discussed here. In this contribution we stress only two aspects.

First, as argued in Gros (2014), the attempt to lower long-term interest rates via bond purchases might not have had the desired expansionary effect on overall demand in the euro area because of the structure of the European mortgage markets.

Second, concentrating on the deflationary impact of oil prices on (headline) inflation missed the point that an improvement of the terms of trade represents a positive supply shock that is unlikely to lead to a deflationary spiral because the higher real income allows domestic demand to expand (Gros, 2015). Moreover, a key concern for the ECB at the time was that in times of high debt, low inflation could endanger debt sustainability, especially for countries with high public debt. However, this concern should not apply when low inflation results from a positive terms of trade shock that improves real income. Consumer price inflation might be low in this case, but nominal GDP should continue to grow (the GDP deflator is not affected by the prices of imported goods), making it easier to highly-indebted enterprises and government to service their debt (Alcidi et al., 2016).

All in all, it thus appears that the ECB, after saving the euro from collapse in 2012, misread the impact of energy prices and embarked on unconventional policies that might not have been needed.

3. THE PAST 5 YEARS (2019-2024)

The past 5 years were associated with two major shocks: the COVID-19 pandemic and then the rise in energy prices after the onset of the Russian invasion of Ukraine. Both shocks originated outside the financial system, and at a time when both business and financial cycles were highly aligned across Member States[3]. Moreover, no large sectoral imbalance had emerged over the preceding years.

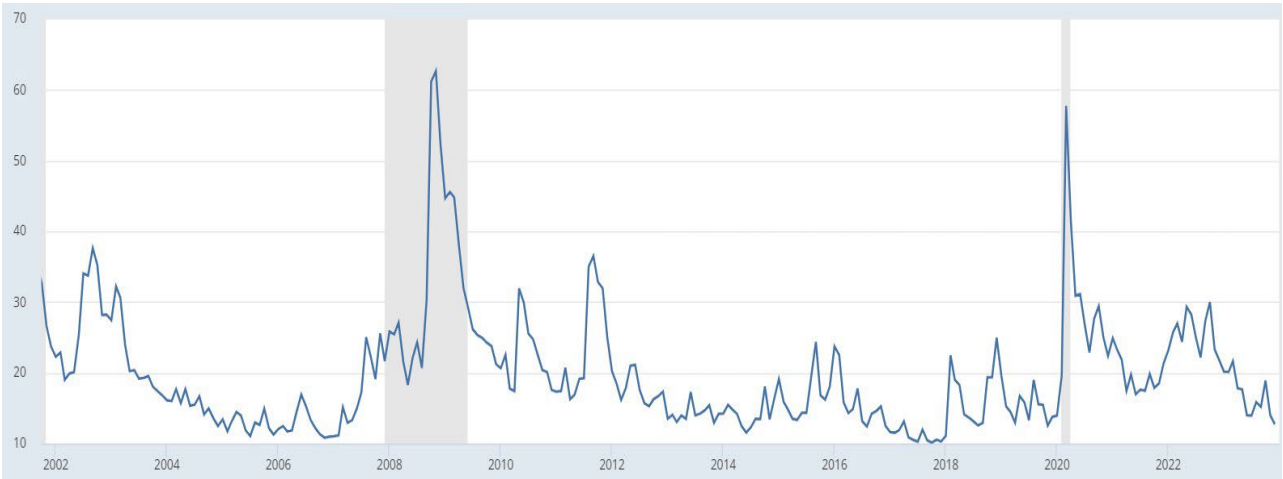
3.1. COVID-19 pandemic (shock)

The response of the ECB to the COVID-19 crisis needs to be analysed separately for the initial phase of financial market turbulence, when the severity of the crisis became apparent (approximately March-April 2020), and the period of gradual reopening following the lockdowns imposed during the first quarter of that year.

During the early 2020 period of financial instability, the ECB reacted quickly and decisively to preserve financial stability, by launching the pandemic emergency purchase programme (PEPP). However, it continued with the measures even when the emergency had ended.

Figure 3 shows the standard measure of 'fear' in financial markets, namely the VIX or volatility index. The time series since 2002 shows two clear spikes: one at the start of the GFC of 2007-2008 and another one in early 2020. It is apparent that the second period of acute volatility was extremely short, much shorter than during the GFC. From a level of close to 60 the index fell back to 30 within a few weeks and continued to decline for the remainder of the year. This suggests that emergency measures to maintain financial market stability were no longer required after the summer of 2020.

Figure 3: VIX Index



Source: FRED.

Note: Shaded area refers to the 2008 Global Financial Crisis (GFC) and the COVID-19 pandemic.

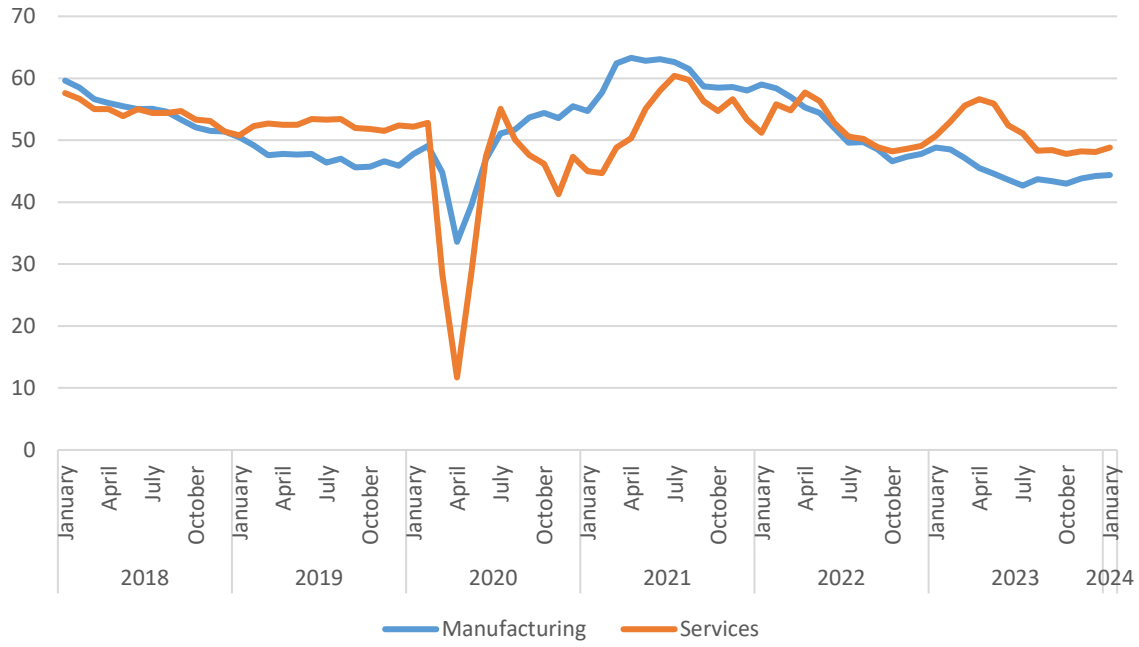
The ECB continued with its extremely expansionary stance despite the return of stability to financial markets because it felt the need to support the recovery from the extremely deep and sharp pandemic recession. The concern might have been both for price and for financial stability. Concerns for financial stability might have been motivated by the spectre of mass insolvencies due to the lockdowns. However, massive government intervention prevented this from happening. In many countries, the number of insolvencies actually fell. Concerns for price stability also seem to have been overrated. Inflation fell during 2020. Headline inflation turned very briefly negative, but mostly because of

[3] https://ec.europa.eu/eurostat/cache/bcc/bcc.html

declining energy prices. The core inflation rate (headline minus energy) never went below 1 %. However, monetary policy might have been a relatively blunt instrument to stimulate the economy during this period because the pandemic recession was not caused by some generalised weakness of demand, but the inability of consumers to spend (and many enterprises to produce) because of the sweeping lockdown in the spring of 2020.

The same applies also to the recovery that set in as soon as the lockdowns were lifted. Gros and Shamsfakhr (2021) argued that the euro area went first through a 'K-shaped' recovery with strong demand for goods and thus industrial output recovering quickly expanding, while services were held back by intermittent lockdowns (see Figure 4). The second phase of the recovery after the definite end of the health emergency led to an inversion between these two sectors where goods demand slowed down sharply while 'revenge travel' led to a boom in tourism and related sectors.

Figure 4. Euro area Purchasing Managers Index (PMI)

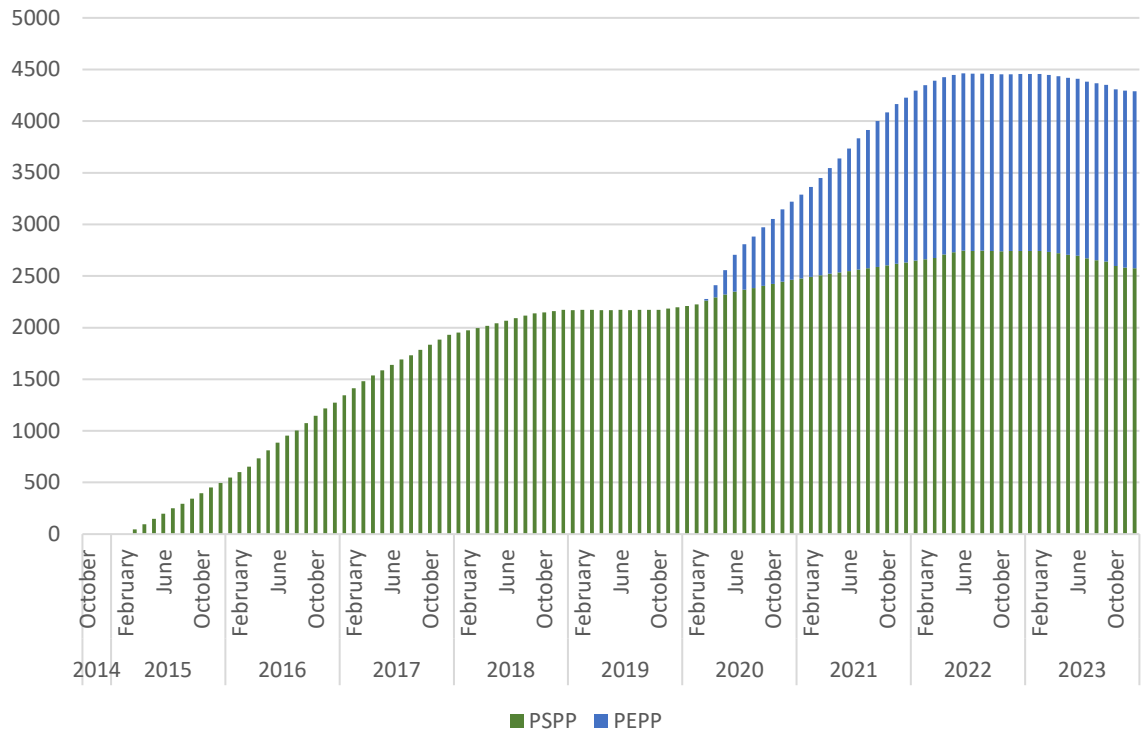


Source: Authors' own elaboration based on data from Markit Economics.

Note: PMI is a survey-based indicator of business conditions, including business output, new orders, employment, costs, selling prices, exports, purchasing activity, supplier performance, backlogs of orders and inventories of both inputs and finished goods.

Throughout these recovery phases the ECB kept its bond purchases (both PSPP and PEPP) at a level that should have been appropriate only for an economy on the brink of acute deflation. The bond holdings of the Eurosystem increased by around EUR 2,000 billion in only two years (from around EUR 2,200 billion end-2019 to over EUR 4,200 billion by end-2021. This was a much more rapid pace of increase than during the previous period of inflation below the 2% target, when it had taken around five years (from 2014 to 2019) to achieve a similar increase.

Figure 5: Cumulative net purchases under PSPP and PEPP (billion EUR)



Source: ECB.

This extraordinary pace of asset accumulation was neither justified by actual and expected deflation, nor could one have expected monetary policy to have a significant impact on the speed of the recovery when the problem was not a lack of overall demand but the sectoral distribution of demand.

Moreover, this accumulation of low-yielding long-term bonds exposed the Eurosystem to significant interest rate risk, already foreseeable much earlier, which then materialised in 2022 and 2023, leading to large losses for the central banks (see Gros and Shamsfakhr, 2022b).

3.2. Dealing with an unprecedented energy price shock

While the economy was well on its way to recovery from the pandemic, the Russian invasion of Ukraine fuelled the prices of energy commodities, particularly gas, which led to a sharp spike in energy prices. Oil prices also rose, but they remained below previous high-water marks, at least in US dollar terms. But the increase was more severe in euro terms as the euro depreciated against the US dollar. The Brent index doubled, briefly rising from about EUR 50 per barrel to a peak of EUR 110. Energy prices, especially for natural gas, had already been increasing before the war throughout 2021 as the global recovery put up pressure on its demand which had been somewhat curtailed by the pandemic.

But the additional supply shock from the war and the subsequent cut-off of Russian supplies led to a massive further increase of energy inflation to 44.3% in March 2022, explaining around 60% of the euro area annual inflation, which at that time had reached 7.4%[4]. The euro area was particularly hard hit by the 2022 spike in natural gas prices, which contributed to the sharp deterioration in the terms of trade, implying a cumulative loss of 2.4 percentage points of GDP over this period (Battistini at al., 2023). By contrast, prices of natural gas actually fell slightly in the US which, as a small net exporter of hydrocarbon fuels, actually experienced a slight gain in the terms of trade (Gros and Galeone, 2023).

[4] Based on Eurostat.

The ECB started tightening its monetary policy stance only after inflation had already reached unprecedented levels. The tightening started very gradually in late 2021 (the headline inflation was already 4.9% by then) by announcing the reduction of net purchases under the asset purchase programme (APP) from mid-2022. The first series of policy rate hikes came only in July 2022 when inflation had reached 8.9%. Given the well-known sluggishness of inflation it was clear at that point that inflation would remain above the target for years rather than months.

3.3. Regime shifts

The main message that emerges from this cursory analysis of the first 25 years of the euro is the importance of regime shifts. The dominant source of shocks can – and at times does – change, and radically.

As shown above, the first 15 years of the euro were marked by the interplay of a credit boom with a fundamental business cycle divergence inside the euro area. This asymmetry had been resolved by about 2015, but left a legacy of weak overall demand. A few years later, the COVID-19 shock was unique in that the lockdowns affected both production and demand. Moreover, the recovery was unbalanced across sectors, rendering monetary policy ineffective in stimulating the economy, thus requiring a different approach. However, the ECB does not seem to have taken this into account.

The energy price shock of 2022 then represented a classic supply shock, but one that had not been experienced at this severity since the 1970s and 1980s. It is not a surprise that the macroeconomic models used by the ECB (as by many other central banks) were a poor guide for policy when one of these fundamental shifts materialised (Gros and Shamsfakhr 2022a; Borio et al, 2023). This became particularly apparent when the ECB did not raise rates until inflation had already reached around 8.6% (in June 2022) because its model-based projections always had inflation coming down to the target by the end of the forecast horizon.

3.4. Unintended consequence of a symmetrical inflation target

The recent spike of inflation raises uncomfortable issues for the move towards the symmetric target of 2% adopted in 2021.The ECB has been very explicit on this point[5].

> *"The Governing Council considers that price stability is best maintained by aiming for 2% inflation over the medium term. The Governing Council's commitment to this target is symmetric. Symmetry means that the Governing Council considers negative and positive deviations from this target as equally undesirable. "*

The implicit assumption behind the switch to a symmetrical inflation target seems to have been that inflation would be relatively stable. To give a concrete example, it seemed natural to regard an overshot of inflation by half a point, i.e. to 2.5%, as equally serious as an undershot of the same magnitude, i.e. inflation at 1.5%. However, over the past five years, inflation in the euro area has been more often outside the corridor mentioned above than inside it.

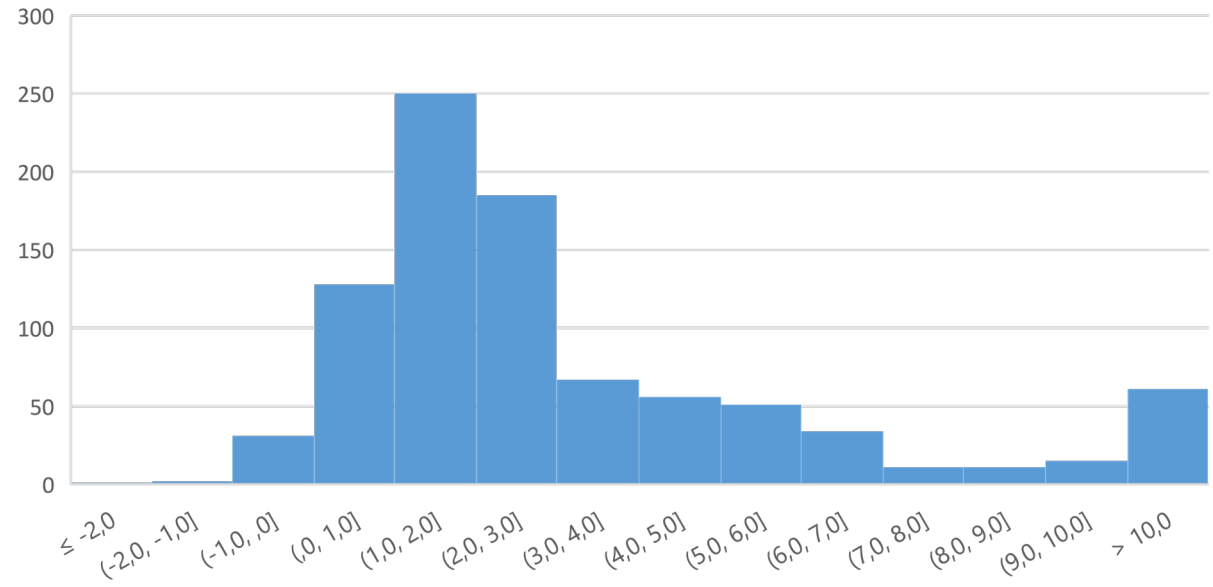
The underlying problem is that experience has shown that the inflation process is not symmetric. Large positive inflation rates are much more likely than large-scale deflation. The long period of 'lowflation' preceding the strategy review by the ECB was exceptional in a longer historical perspective.

Figure 6 shows the frequency distribution of annual core inflation rates across selected OECD countries over the past 40 years (between 1980 and 2022). We use core inflation here to have a measure of inflation that is not influenced by volatile items such as energy prices. The frequency distribution

[5] https://www.ecb.europa.eu/home/search/review/html/ecb.strategyreview_monpol_strategy_statement.en.html

presented below should thus not influenced by the large variations in oil and energy prices mentioned above. Central banks should be seen as responsible for core inflation or underlying inflation.

Figure 6: Core inflation frequency, 1980-2022



Source: Authors' elaborations based on OECD data.

Note: The sample includes 20 countries in Western Europe, Northern America, plus Japan, Australia and New Zealand. The vertical axis indicates the frequency, the horizontal axis indicates the inflation range corresponding to each bar.

It is apparent that the distribution of core inflation is asymmetric with moderate inflation rates, i.e. 2-3%, much more frequent than deflation, with no deflation more severe than (minus) 1% observed for 50 years in all these countries. Low inflation, defined as a rate between 0 and 1%, occurred 100 times, but was much less frequent than the two buckets close to today's inflation target of 2% (1-2% and 2-3%). Falling (non-energy) prices are very rare, much rarer than moderate to high inflation rates (above 3%).

Economic models usually assume that economic welfare loss from inflation that is either too high or too low worsens as the difference from the target increases. In fact, the negative impact is assumed to increase at a faster rate than the difference itself. If this metric were applied to the recent period of high inflation one would have to conclude that the welfare losses of having inflation more than 5 percentage points above the target by far outweighs the losses from having had inflation for some years 0.5 percentage points below. If one looks only at the arithmetic mean one could conclude that 5 years of inflation at 1% (one point below the target) are as important as one year of inflation at 7% (5 points above the target). But if one attributes larger deviations more than proportionally large welfare costs, the one year of inflation 5 points above the target would cause much more damage than the five years of inflation 0.5 points below the target[6].

The ECB, in the next strategy review (2025), should clarify whether its concept of a symmetric inflation target only looks at the average, or also at the size of the deviation from the target.

[6] Applying the quadratic formula used widely in the literature, the one year of inflation 5 points above the target would cause a loss that is 100 times larger than one year of inflation 0.5 points below the target. One year of inflation at 7 % would thus cause a welfare loss 20 times higher than five years of inflation at 1.5 % (half a percentage point below the target).

4. FUTURE CHALLENGES

The overriding mandate of the ECB is to preserve price stability. The first 25 years brought many different challenges. The most difficult challenges are those that lead to sudden changes in prices or endanger systemic instability because an impaired financial system can lead to strong deflationary pressures as investment and other interest sensitive expenditure is curtailed. Our analysis of the origin of the euro sovereign debt crisis suggests that it is unlikely to return, at least in this systemic form.

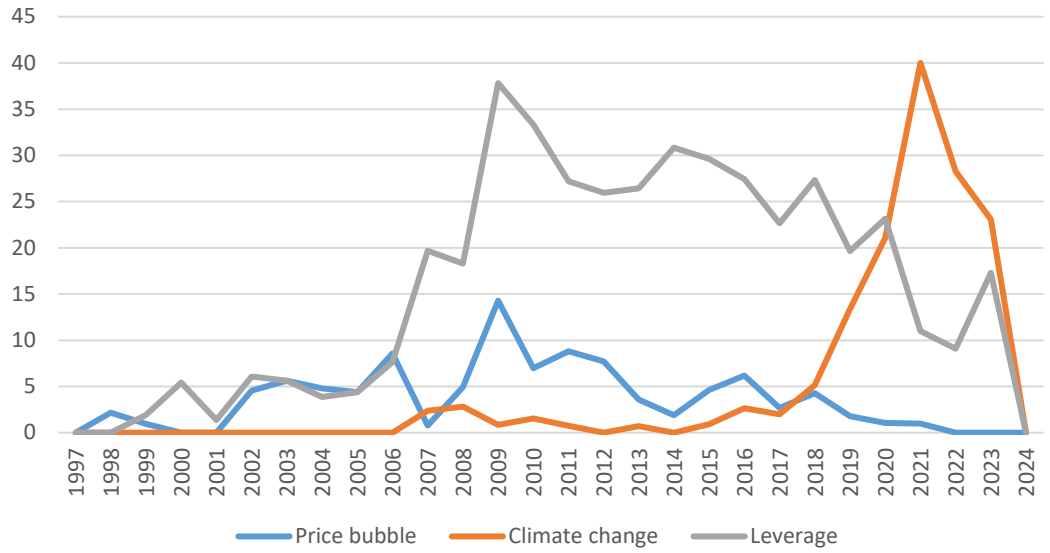
Public debt levels have increased further after the COVID-19 crisis and the energy price shock. The latent danger that one or more countries might experience a debt crisis thus continues. However, resulting financial instability is unlikely to be as broad based as it was in 2011-2012. Moreover, there exist now institutions to manage this kind of problems (such a European Stability Mechanism[ESM]) and the banking system is much better capitalised and supervised (with the Single Resolution Mechanism [SSM] in place). Completing the Banking Union should remain a policy goal. But the present set-up, although incomplete, has made the euro area already much more resilient.

It is not possible to address here all potential future challenges to price stability. This section deals only with one of them, namely climate change. It is apparent that ECB officials have been increasingly preoccupied with climate change as can be seen from the fact that the term climate change has appeared hundreds of times in ECB speeches over the last years with close to 40% of all Executive Board members' speeches mentioning it in 2021 (Figure 7). Moreover, the ECB has also drawn up a Climate and Nature Plan with a detailed roadmap.[7]

Combating global climate change is a key goal for the EU today and is likely to remain a challenge for a generation of policymakers. At present, it is highly uncertain how the path of global emissions will evolve and how the climate will react. An increasingly likely scenario for Europe must be one under which emissions continue to grow at the global level while Europe reduces its own. European policymakers must be prepared for a difficult combination of high mitigation costs and still substantial climate change risks because it is unlikely that the rest of the world will emulate the ambitious emission reduction efforts of the EU. Such an unfavourable scenario will create many challenges for EU policymakers that cannot all be treated here. The key question for the ECB is whether climate change poses a risk to price and/or financial stability.

[7] https://www.ecb.europa.eu/press/pr/date/2024/html/ecb.pr240130_annex~b239ad1c2e.en.pdf

Figure 7: Share of speeches with at least one keyword occurrence, in %



Source: Authors' elaborations based on the dataset of ECB Executive Board speeches available at: https://www.ecb.europa.eu/press/key/html/downloads.en.html

A priori it seems unlikely that climate change will create difficult challenges for price stability for the simple reason that the negative consequences of climate change will arise gradually over the next decades and even under pessimistic scenarios the direct impact would be limited for Europe (Oehmke and Opp, 2022).

Moreover, the most severe economic losses are expected only after 2030 or even after 2050. For example, Kahn et al. (2021) project for Europe by 2030 only losses of less than 1 percentage point and potentially even a small gain if the Paris Agreement were to be implemented. By 2050, the losses would increase for Europe in an unmitigated scenario to over 2 percentage points of GDP. But this is more than 25 years into the future.

The physical damage from climate change should thus not be called a shock, but rather a slow-moving (negative) trend that should not affect the ability of the ECB to maintain price stability.

This section therefore focuses specifically on climate change as a potential risk to financial stability.[8] There is now a large literature[9] on potential financial risks from climate change. The ECB published its first assessment of climate-related risks in 2021 (ECB, 2021).

That assessment, along with many others (see the survey of Caroll, 2022), was based on a detailed analysis of the lending portfolios of banks and of the balance sheets of carbon-intensive industries. This short contribution cannot do justice to this very careful and detailed work. It might be useful instead to emphasise two general considerations regarding transition risks and the difference between financial risks in general and systemic risks.

[8] The question of whether the ECB should pursue a green monetary policy to incentivise mitigation, i.e. a reduction in carbon emissions, is not the focus here. Gros and Shamsfakhr (2023) argue that the ECB should pursue only its price-stability mandate, leaving climate-change policies to the political level (Member States and the European institutions such as the Commission and the European Parliament).

[9] See for example Lamperti et al. (2019); Battiston et al. (2021); Campiglio and der Ploeg (2021); Chenet et al. (2021); Feyen et al. (2021).

4.1. Systemic financial risks

Experience has shown that systemic crises arise typically after a boom phase during which risk appetite is high, allowing credit to expand to sectors that appear to have a bright future and engage in extensive leverage. The crisis is then triggered by an event that punctures these rosy expectations. As argued above, real estate is often at the core of banking and financial crises because construction is financed mostly by bank credit and is highly leveraged. A modest change in house prices can thus lead to sharp swings in the net worth of the operators involved. Most other sectors have a much lower degree of leverage than housing and construction, and climate change is not expected to have direct sharp impacts specifically on construction activity in the EU, although there might be indirect effects and linkages.

This implies that one would not expect climate-related risk to lead to systemic financial crisis, unless the mitigation efforts start very late and in a sudden manner (ESRB, 2016). This does not mean that climate change cannot be expected to have a substantial economic cost. But the fact that climate change can have large negative effects on the economy is by now widely known, even if the magnitude and the timing remain impossible to predict with precision. The materialisation of this risk is thus unlikely to surprise financial markets, making it less likely that climate change will lead to systemic financial crisis. However, even a low probability of systemic risk does not imply that supervisors should relax. The uncertainty surrounding climate change and the EU's mitigation measures is still so large that the materialisation of the risk could still imperil the stability of individual banks or financial institutions.

4.2. Physical risks

As mentioned above, climate change is a process that evolves very quickly in geological time scales, but will still take decades to lead to major changes in the climate. This long-time horizon matters. The average term for bank loans is below five years. It is thus highly unlikely that physical risks from climate change will have an impact on financial stability in the euro area for the next decade or so. The insurance sector might of course experience large losses as a result of extreme whether events. However, this sector is rather stable because it is not subject to run risks like the banking sector.

Table 1: Percent loss in GDP per capita by 2030, 2050 and 2100 under the RCP 2.6 and RCP 8.5 scenarios

	2030			2050			2100		
World									
RCP 2.6	−0.01	−0.01	−0.02	0.06	0.11	0.16	0.58	1.07	1.57
RCP 8.5	0.40	0.80	1.25	1.39	2.51	3.67	4.44	7.22	9.96
China									
RCP 2.6	−0.22	−0.45	−0.71	−0.38	−0.80	−1.31	0.24	0.45	0.67
RCP 8.5	0.31	0.58	0.87	0.90	1.62	2.30	2.67	4.35	5.93
European Union									
RCP 2.6	−0.04	−0.08	−0.13	−0.06	−0.13	−0.22	0.05	0.09	0.13
RCP 8.5	0.24	0.50	0.80	0.79	1.53	2.35	2.67	4.66	6.69

Source: Kahn et al. (2021).

Note: Representative Concentration Pathways (RCP) are scenarios of greenhouse gas concentrations, constructed by the Intergovernmental Panel on Climate Change (IPCC). RCP 2.6 corresponds to the Paris Agreement, which

aims to hold the increase in the global average temperature to below 2 degrees Celsius above pre-industrial levels. RCP 8.5 is an unmitigated scenario in which emissions continue to rise throughout the 21st century.

The existing empirical literature on the direct impact of climate change on price stability find only a limited effect. One key element of most climate models is that the increase in mean temperatures will be accompanied by a higher probability of extreme weather events. The key question is then whether a higher incidence of extreme temperatures would impact price stability because extreme weather events could sharply reduce agricultural yields. The empirical literature finds indeed an impact of very hot summers on inflation in emerging economies (Parker, 2018). However, there is no significant impact on inflation for advanced countries. This result is not surprising given the much smaller weight of agriculture as well as lower share of food in the overall consumer basket in advanced countries (including most of the euro area). Faccia et al. (2021) find some effects for the euro area, but the statistical basis is much lower than that commonly accepted in the academic literature.

4.3. Transition risks

Transition risk refers to sudden changes in measures taken to accelerate mitigation efforts. Different models take different approaches to model transition risk. However, transition risk could potentially lead to a sudden increase in the cost of carbon. This suggests that the Emissions Trading System (ETS) price might be the key indicator of transition risk as it directly affects the cost of 'brown' activities.

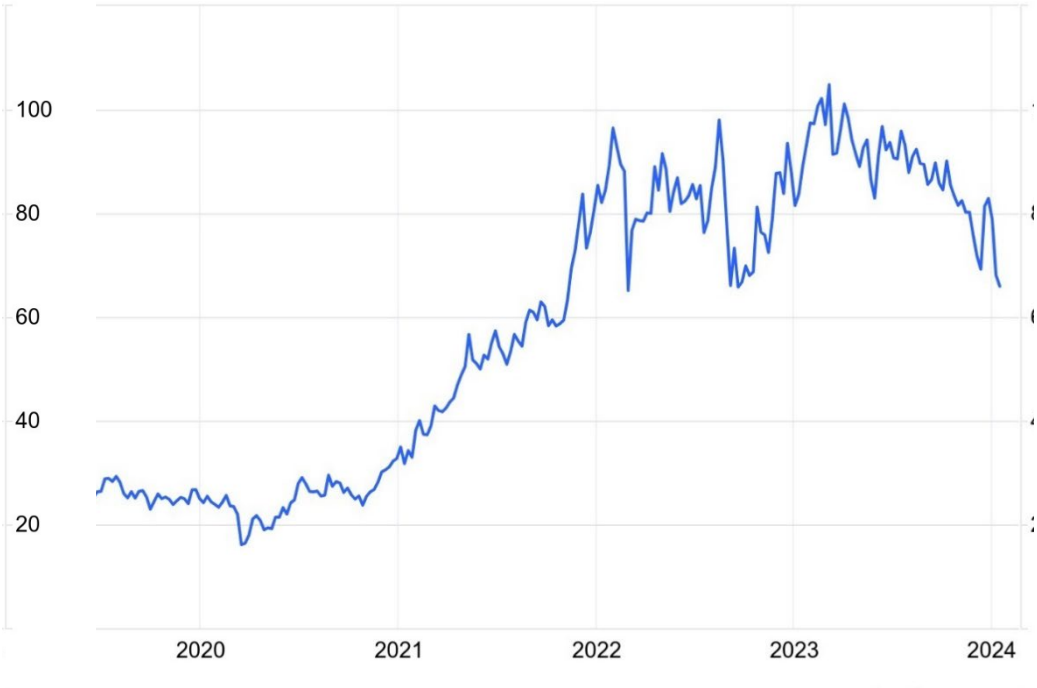
The past two and half years have provided a test of the resilience of the euro area's financial system transition risk because the ETS price rose rather quickly (and unexpectedly) during 2021 from its previous stable level of EUR 20 (per ton of CO2) to over EUR 80, even briefly touching EUR 100 in early 2023. However, this fourfold increase did not lead to any noticeable financial stress.

The increase in the ETS price was accompanied by a very sharp increase in overall energy prices and substantial government support for energy-intensive industries, which might have reduced the burden for carbon intensive firms. But subsidies for energy-intensive industries have already been much reduced while energy prices remain considerably above longer-term pre-COVID-19 averages, without generating any particular stress on the financial system.

The experience of the past few years thus suggests that transition risks should be manageable given the diversified nature of the European economy, in which the energy-intensive sectors account only for a small share of overall value added (Jäger, 2023).

Simulations for Italy suggest, moreover, that the most energy-intensive activities do not experience higher loan losses. This is unlikely to change even in the medium run as mitigation efforts ramp up, since energy-intensive industries are in general well capitalised. Moreover, there might be some subsectors that benefit from the transition even within very 'brown' sectors such as insulation and installation of rooftop solar in construction (Brandoli et al., 2021).

Figure 7. EU Carbon permits (Price, EUR)



Source: TradingEconomics.

4.4. The economy-wide impact of transition risk

The analysis so far suggests that what is usually regarded as transition risk should be manageable and that the past two years of high energy prices and a high ETS price provided an encouraging stress test. However, when considering potential financial risks, it would be a mistake to concentrate only on brown versus green industries or activities. The green transition is likely to force changes in many sectors, even those that might not immediately be particularly carbon-intensive per se.

The broad-based nature of transition risk is best illustrated by the problems in the European automobile sector. The advance of electric vehicles (EVs) is part of the overall transition towards a low-carbon economy. But EVs require fewer components and labour input. The changeover to EVs will require considerable adjustment effort from both component suppliers and the car producers. All of them face considerable uncertainty concerning the evolution of the demand for EVs, which is heavily influenced by government subsidies and that can change quickly when budgets come under stress. But they are also subject to increasing global competition, especially from China. Moreover, the transition to EVs interacts with the increasing use of software in cars, mainly for machine-assisted driving. The green and digital transition thus interact in this sector. However, whether the European car industry becomes a source of problems or prospers depends to a large extent on its ability to withstand global competition.

This suggests that it would be a mistake to focus on brown sectors as a source of particular concern for financial stability resulting from the green or the digital transition. There is thus little justification (from a purely financial stability point of view) for special capital requirements on loans to brown enterprises. The detailed transition plans, that the SSM is now requiring from the banking sector, are also unlikely to provide much additional insights regarding the main sources of banking risk.

A similar reasoning applies, *mutatis mutandis*, to the remainder of the financial system, especially the bond markets. Ratings agencies and investors already know about the green transition and any direct threats to the viability of brown enterprises will have been already factored in to ratings and bond prices. Most energy-intensive (i.e. brown) manufacturing enterprises engage in a large variety of

processes, some more energy-intensive than others, but many are exposed to fierce international competition. The key for the survival of these firms might therefore not be the price of emission certificates, but their position in the supply chain and their ability to withstand global competition.

The overall conclusion is that a large open economy like that of the euro area is always subject to shocks coming from both technology and trade. The transformation of the energy sector will be profound, but only concerns a small part of the overall economy that remains dominated by services. The entire economy will be affected by the digital transition in ways that are impossible to predict today. But this is not new. Technology never stands still and global competition never sleeps. The continuing advance of China as a major competitor in industries hitherto dominated by the EU is likely to represent a more important source of shocks than the green transition.

While the ECB is primarily focused on maintaining price stability and preserving the purchasing power of the single currency, it also plays a supervision role as guardian of financial stability, where it maintains a high level of vigilance about all sources of shocks, not just climate change.

5. CONCLUSION

Looking back at the 25 years of euro unity, the ECB has faced three major shocks of various nature and origins and with different implications for macrofinancial stability: the Global Financial Crisis, the COVID-19 pandemic recession; and the recent massive spike in energy prices. While the first two crises had mainly deflationary effects, the third was clearly inflationary. The ECB was able to defuse the deflationary impact of the first two shocks, employing a massive-scale of unconventional policy instruments like asset purchases and long-term loans to banks.

Our analysis suggests that the strongly asymmetric impact of the global financial crisis on the euro area was due to a unique combination of circumstances (mainly German unification) that is unlikely to occur again. Moreover, there now exist common crisis management institutions that will be able to deal with future asymmetric shocks. The euro area might thus be more stable than the crisis of 2011-2012 suggests.

The long period of inflation (slightly) below target might have been one of the causes for the late reaction of the ECB to the inflationary pressures that arose just as it made its inflation target more symmetric. The formal symmetry of the inflation target adopted in 2021 seemed entirely appropriate when the background was one of low and stable inflation. But over the longer run the inflation process is highly asymmetrical with historical experience showing that, with inflation considerably above 2% is much more frequent than even mild deflation. One focus of the next monetary strategy review should thus be a clarification whether the ECB's target of 2% over the medium run refers only to average, or whether the variability around the target also matters.

REFERENCES

- Alcidi, C., Busse, M. and Gros, D. (2016), *Is there a need for additional monetary stimulus? Insights from the original Taylor Rule*, CEPS Policy Brief. https://www.ceps.eu/ceps-publications/there-need-additional-monetary-stimulus-insights-original-taylor-rule/
- Battiston, S., Dafermos, Y. and Monasterolo, I. (2021), 'Climate risks and financial stability', *Journal of Financial Stability*, Vol. 54, pp.100-867. https://doi.org/10.1016/j.jfs.2021.100867
- Battistini, N., Bobasu, A. and Gareis, J. (2023), Who foots the bill? The uneven impact of the recent energy price shock, published as part of the ECB Economic Bulletin, Issue 2/2023. https://www.ecb.europa.eu/pub/economic-bulletin/focus/2023/html/ecb.ebbox202302_05~d811cd64f4.en.html
- Belke, A. H. and Gros, D. (2007), *Instability of the Eurozone? On Monetary Policy, House Prices and Labor Market Reforms*, IZA Discussion Papers N.2547, Institute of Labor Economics (IZA), https://ideas.repec.org/p/iza/izadps/dp2547.html
- Bonam, D., Galati, G., Hindrayanto, I, Hoeberichts, M., Samarina, S. and Stanga, I. (2019), *Inflation in the euro area since the Global Financial Crisis*, De Nederlandsche Bank N.V., https://www.dnb.nl/media/gman4bll/occasional_study_inflation_in_the_euro_area_since_the_global_financial_crisis.pdf
- Borio, C., Lombardi, M., Yetman, J. and Zakrajšek, E. (2023), *The two-regime view of inflation*, BIS Papers No. 133. https://www.bis.org/publ/bppdf/bispap133.pdf
- Brandoli, E., Catalano, M., Cavallo, A., Forni, L., Pezzolla, E., Prosperi, L., Romeo, R. and Tizzanini, G. (2021). *Assessing climate risks in the Italian financial sector*, Working paper, Prometeia, Bologna.
- Campiglio, E. and der Ploeg, Ri. V. (2021), 'Macro-Financial Transition Risks in the Fight Against Global Warming'. http://dx.doi.org/10.2139/ssrn.3862256
- Chenet, H., Ryan-Collins, J. and Van Lerven, F. (2021), 'Finance, climate-change and radical uncertainty: Towards a precautionary approach to financial policy', *Ecological Economics*, 183, p.106957. https://www.sciencedirect.com/science/article/pii/S092180092100015X
- Christiano, L.J. and Fitzgerald, T.J. (2003), 'The Band Pass Filter', *International Economic Review*, Department of Economics, University of Pennsylvania and Osaka University Institute of Social and Economic Research Association, Vol. 44(2), pp.435-465. https://ideas.repec.org/a/ier/iecrev/v44y2003i2p435-465.html
- ECB (2021), *Climate-related risk and financial stability*, ECB/ESRB Project Team on climate risk monitoring, https://www.ecb.europa.eu/pub/pdf/other/ecb.climateriskfinancialstability202107~87822fae81.en.pdf
- ESRB (2016), *Too late, too sudden: Transition to a low-carbon economy and systemic risk*, A group of the ESRB Advisory Scientific Committee, No.6, February 2016, https://www.esrb.europa.eu/pub/pdf/asc/Reports_ASC_6_1602.pdf
- Feyen, L., Ciscar, J.C., Gosling, S., Ibarreta, D., and Soria, A (2021), *Climate change impacts and adaptation in Europe*, JRC PESETA IV final report, European Commission, https://data.europa.eu/doi/10.2760/171121

- Gros, D. (2009), *The long shadow of the wall on Europe's economy*, CEPS Commentary, https://www.researchgate.net/publication/45589814_The_long_shadow_of_the_wall_on_Europe's_economy_CEPS_Commentaries_13_November_2009
- Gros, D. (2014), *Fighting Deflation: Would QE work in the euro area?*, CEPS Commentary, https://cdn.ceps.eu/wp-content/uploads/2014/10/DG%20ECB%27s%20Faulty%20Weapon.pdf
- Gros, D. (2015), *Why Deflation is Good News for Europe*, Project Syndicate, https://www.project-syndicate.org/commentary/europe-deflation-good-news-by-daniel-gros-2015-03?barrier=accesspaylog
- Gros, D. and F. Shamsfakhr (2021). 'Adjusting Support in a K-Shaped Recovery'. European Parliament, ECON committee, Monetary Dialogue Papers. https://www.europarl.europa.eu/cmsdata/230557/CEPS_formatted.pdf
- Gros, D. and Shamsfakhr, F. (2022a), 'The ECB's normalisation path – Model-rather than data-driven', Centre for European Policy Studies. https://www.ceps.eu/ceps-publications/the-ecbs-normalisation-path/
- Gros, D. and Shamsfakhr, F. (2022b), 'The real fiscal cost of central bank bond buying', Centre for European Policy Studies, April. https://www.ceps.eu/ceps-publications/the-real-fiscal-cost-of-central-bank-bond-buying/#:~:text=This%20is%20uncontroversial%20among%20economists,euro%20over%20the%20programmes'%20lifetime
- Gros, D. and Shamsfakhr, F. (2023), Shades of Green Monetary Policy: Would a green tilt help?, Monetary Dialogue Papers, November. https://www.europarl.europa.eu/RegData/etudes/IDAN/2023/755709/IPOL_IDA(2023)755709_EN.pdf
- Gros, D. and Galeone, P. (2023), 'Regime shifts and the last mile of disinflation', VoxEU.org, 29 December. https://cepr.org/voxeu/columns/regime-shifts-and-last-mile-disinflation
- Jäger, P. (2023). 'Rustbelt relics or future keystone? EU policy for energy-intensive industries'. Policy Paper, Jacques Delors Centre. https://www.delorscentre.eu/fileadmin/2_Research/1_About_our_research/2_Research_centres/6_Jacques_Delors_Centre/Publications/20231221_Jaeger_Industries.pdf
- Kahn, M.E., Mohaddes, K., Ng, R.N., Pesaran, M.H., Raissi, M. and Yang, J.C., (2021), 'Long-term macroeconomic effects of climate change: A cross-country analysis', Energy Economics, Vol. 104, p.105624. https://www.sciencedirect.com/science/article/pii/S0140988321004898
- Lamperti, F., Bosetti, V., Roventini, A. (2019), The public costs of climate-induced financial instability', Nature Climate Change, 9, pp.829-833. https://doi.org/10.1038/s41558-019-0607-5
- Licchetta, M., Mattozzi, G., Raciborski, R. and Willis, R. (2022), Economic adjustment in the euro area and the United States during the COVID-19 crisis, SUERF Policy Brief No. 341. https://www.suerf.org/wp-content/uploads/2023/12/f_9944485737760f99d8ee077801303091_46541_suerf.pdf
- Newell, R.G., Prest, B.C. and Sexton, S.E. (2021), 'The GDP-temperature relationship: implications for climate change damages', Journal of Environmental Economics and Management, Vol.108, pp.102-445, https://www.sciencedirect.com/science/article/abs/pii/S0095069621000280?via%3Dihub
- Oehmke, M. and Opp, Ma. M. (2022), Green Capital Requirements, Swedish House of Finance Research Paper, No. 22-16. http://dx.doi.org/10.2139/ssrn.4040098

- Sandbu, M. (2017), Europe's Orphan: The future of the Euro and the politics of debt, Princeton University Press, https://press.princeton.edu/books/paperback/9780691175942/europes-orphan

The euro area has been subject to a series of very different shocks, some of which, such as the COVID-19 pandemic, were unprecedented. While the ECB's reaction to these deflationary shocks was vigorous, it persisted too long with its expansionary measures and failed to see their inflationary impact when energy prices shot up. The future is likely to bring new challenges, but climate change might not be the most important threat to price and financial stability.

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