Volume 57 | Number 5 **September/October 2022**

Intereconomics

Review of European Economic Policy

FORUM

The Return of the Eurozone Crisis?

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A 58369 ISSN 0020-5346

Springer

CENTRE FOR EUROPEAN POLICY STUDIES

ZBW Leibniz-Informationszentrum Wirtschaft
Leibniz Information Centre for Economics

www.intereconomics.eu

Intereconomics

Review of European Economic Policy

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DOI: 10.1007/s10272-022-1070-5

Intereconomics, 2022, 57(5), 270-271

JEL: E00, E6, O4

The Leopard: How a Post-Fascist Party Rose to Power in Italy

Italy has been approaching general elections with deteriorating economic fundamentals. Due to the war in Ukraine, the economic recovery has slowed considerably, while the GDP is still below the 2008 level. This decade-long stagnation has hit low- and middle-income Italians harder. As a result, income and wealth inequality has been steadily increasing (Guzzardi et al., 2022). According to Eurostat, 25% of the Italian population is at risk of poverty (the EU average is 21.7%), and 11.7% of workers are poor due to temporary and part-time jobs. While employment recovered quickly in 2022, temporary jobs have skyrocketed to the record level of 3,176,000, according to ISTAT. Still in Q2 2022, inflation jumped to 6.9%, and OECD expects Italian real wages to fall by 3% over the course of 2022. This is going to further exacerbate the long-run plunge of the real wage: Italy is the only OECD member where real wages have fallen (-2.9%) since 1990.

The coronavirus pandemic and Russian war in Ukraine have magnified the fragility of the Italian economy, exposed to increasingly poisonous doses of neoliberal economic policies based on fiscal austerity and "flexibilisations" of the labour market (the Berlin–Washington consensus, see Fitoussi and Saraceno, 2013) and nested in the longer-term end of the post-war social compromise (Dosi and Virgillito, 2019). The result has been a decrease in health and education expenditures and public investment. Meanwhile, labour market structural reforms of the 1990s and 2000s have increased fixed-term and part-time contracts and raised wage inequality and volatility (Hoffman et al., 2021) with the effect of slowing down productivity and output growth (Dosi et al., 2021).

During the COVID-19 pandemic, the EU has timidly started changing its economic policy stance. With Next Generation EU (NGEU), it has issued common debt to finance a vast programme of public investment with a significant transfer of resources to its weakest members. The European Chips Act and the Fit for 55 package have possibly inaugurated a new season of innovation and industrial policy. With the directive on adequate minimum wages, the EU proposed regulation in European labour markets against a freefall to the bottom. If one is optimistic, the new EU policy framework can be seen as part of a belated general change away from the scourge of neo-liberalism (Stiglitz, 2019), including Bidenomics. Worldwide there is an increasing case for a New Consensus, grounded in more intense state intervention to tackle inequality, give workers more power, raise public expenditure in health and education, and ultimately guide the process of innovation and economic development.

A lingering question is whether the EU is actually embracing the new zeitgeist. For sure, Italy is still trapped in the adagio from the novel The Leopard: "everything must change to remain the same". And what must not change is the neoliberal policy framework mitigated by some cosmetic corrections, witnessed both by the Italian NGEU plan and the Draghi economic policies more generally. The Italian NGEU plan is a poorly assembled collection of projects provided by the ministries often out of their longstanding list of unfunded initiatives, glued together with the buzzwords of private consultants. It is clear that the bulk of the funds will be ultimately transferred to the firms with very few conditions attached, if any. And it could have been even worse if the European Commission had not rejected the carbon-capture-and-storage project sponsored by Eni to produce blue hydrogen.

On the reform side, the Italian NGEU plan is also disappointing. The introduction of a minimum wage was jettisoned in the final version of the plan. More generally, while in other countries, e.g.

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Spain, fixed-term contracts have been discouraged with good results in terms of employment, the Italian government has made them easier. The proposals of a commission created by the Ministry of Labour to tackle the issue of the working poor has been ignored, while the conditions of access to the Italian anti-poverty scheme have been made stricter. At the same time, the number of bonuses has proliferated: There are even subsides for buying new-generation televisions, anti-solar curtains and spa services. Finally, in the fiscal domain, despite evidence that Italians in the top 5% of income distribution pay a lower effective tax rate than the rest of the population (Guzzardi et al., 2022), no increase in progressivity is envisaged, rather just fine-tuning the status quo.

The fault line between Italy and any New Consensus policy agenda can be observed in climate policies. Italy has tried to postpone the introduction of the EU ban on combustion engine cars, while introducing subsidies for buying new diesel and gasoline cars. There are still generous subsidies for the purchase of gas-fired heating systems. Italy has been outpaced by Germany and the Netherlands in the installation of new solar power capacity, while the government has not succeeded in easing the bureaucratic procedures to install new renewable energy plants. However, the Minister of "Ecological Transition" has warned against the lobby of renewable energy (sic!).

The bottom line, in our opinion, is that the executive led by Mr Draghi never had a vision for Italy to achieve sustainable and inclusive growth while relaunching innovation and productivity, trapped as it largely was in the myth that "markets know better". The only opposition able to capture a good deal of social discontent has been the post-fascist right, as the Democratic Party (PD) fully identified with a wealthy and socially secure establishment.

The policy agenda of the right-wing parties fully embraces a neoliberal economic programme, which ignores the climate emergency and pushes the flat tax as its flagship policy. Conversely, the leader of the PD, Mr Letta, has tried (and failed) to form an alliance with a centrist party on the ground, excluding the Five Star Movement (M5S). Given the Italian electoral law, Mr Letta has de facto deliberately chosen to lose the elections because a coalition with the M5S was essential to win a majority of the first-past-the-post seats. At the end of the day, the M5S has been the only sponsor of a progressive agenda and performed much better than expected, while the PD confirmed its decline.

Mr Draghi recently declared that Italy shall succeed with any government. We are not as optimistic, and we see precise links between the economic policies of his government, the results of the elections and the next economic agenda. There is a more general lesson here, which goes beyond the Italian borders. When the former progressive parties give up their social agenda, the mounting fears, anger and frustration of an increasing percentage of people get picked up by right-wing movements. These movements are able to combine the continuation of neo-liberal policies in the socio-economic domain with a construction of collective identities with many fascist ascendancies: the nation, the family, the Christian roots, the hate toward the "other", the strong man/woman in charge, etc. After one century, Italy is likely to be again the victim of such a social experiment, with a (post?) fascist prime minister. We just hope our prediction is wrong.

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DOI: 10.1007/s10272-022-1077-y

The Return of the Eurozone Crisis?

In the past few years and months, a number of subsequent shocks have hit the European economies. A combination of high levels of public debt, stagflation as well as the announcement of a joint return to contractionary monetary and fiscal policy could be a challenge for the Economic and Monetary Union given that interest rates on government bonds, in particular in southern Europe, increased substantially in recent weeks. This Forum takes a look at the factors that have contributed to the recent return of interest rate spreads, analyses the new developments in macroeconomic aggregates and considers how the EU should respond to the emerging crisis.

DOI: 10.1007/s10272-022-1078-x

Intereconomics, 2022, 57(5), 273-277

JEL: E52, F33

Paul De Grauwe

Towards a New Euro Crisis?

Ten years ago, the eurozone experienced an existential crisis. During 2012, it became a popular sport to forecast the date when the system would crash and the euro would disappear. In those days when the sovereign debt crisis hit the eurozone, we learned that the system is fragile and that relatively small shocks could lead to its disintegration.

In this article, I take up the fragility problem of the eurozone. I discuss first the origin of this fragility. Then I look at the history of this fragility and analyse what has been done to the governance of the eurozone over the years to reduce its fragility and make it more sustainable. I conclude with the question: Have we done enough to strengthen the eurozone so that we can now be sure it is prepared to face future crises, in particular the inflation crisis that we are confronting today?

Defining fragility

The eurozone is a fragile construction. Governments of the member countries of a monetary union issue bonds that they promise to convert at maturity in a currency, the euro, over which they have no control. It is as if each of these governments issues debt in a foreign currency. Like the Argentinian government when it issues bonds in dollars, it is a currency that this government does not control (Eichengreen et al., 2005).

As a result, the governments of a monetary union cannot give a 100% guarantee to the bondholders that they will have the necessary liquidity to pay them out at maturity. The risk that governments can run out of cash in a monetary union creates the potential for self-fulfilling liquidity crises: investors who are afraid that the government may run out of cash, panic and massively sell that government's bonds, thereby precipitating the liquidity crisis that they were afraid of. Such a crisis may force the government to default on its debt (De Grauwe, 2011; Beirne and Fratscher, 2012; De Grauwe and Ji, 2013; Aizenman et al., 2013; Montfort and Renne, 2013).

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This problem does not exist in stand-alone countries where governments issue debt in their own currency. Investors know that these governments are backed by a central bank that is ready (or can be forced) to provide all the cash that is necessary to that government in times of crises. Thus, investors cannot force default on a stand-alone country's government. They can force default of national governments in a monetary union; an extraordinary implication of a monetary union that was overlooked when the eurozone was created. This also implies that the balance of power shifted in favour of financial markets against the sovereigns when countries joined the monetary union. A paradoxical situation because we thought that being in a union would make the member countries stronger. Exactly the opposite occurred: By entering the monetary union, the governments of the member countries were weakened while the power of financial markets over these governments increased.

The history of the eurozone's fragility

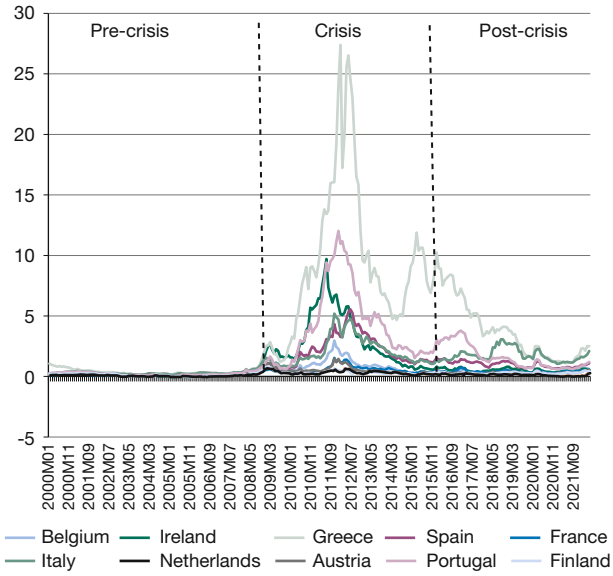
The best measures of the fragility of the eurozone are the "spreads" in the government bond markets. These are the differences in the 10-year government bond yields of member countries with the 10-year government bond yield of Germany. The underlying assumption is that the German government bond yield is risk-free. Therefore, any positive difference between the yield of the bond of a particular government and that risk-free rate expresses the risk investors attach to holding the bond of that government. Let us look at the spreads from 2000 and 2022 (Figure 1).

The period 2000-2022 is divided into three sub-periods: the pre-crisis, the crisis and the post-crisis periods. These three sub-periods can instruct us about how the fragility of the eurozone evolved over time.

Pre-crisis period

During this period, the spreads were virtually zero. This implies that government bonds in the eurozone countries were seen as (almost) perfect substitutes. Thus, investors considered the risk involved in holding, say, a Greek government bond to be the same as the risk in holding a German bond. One can say that this was the honeymoon

Figure 1
Ten-year government bond spreads, selected eurozone countries, 2000-2021
in %



Source: Eurostat.

period of the eurozone. Everything looked beautiful, no clouds in the sky. A remarkable situation during which investors and policymakers lived in a fantasy world.

Crisis period

The financial crisis of 2008 completely changed the risk perceptions in the government bond markets. The governments of those countries hit most by the financial crisis saw their budgetary and debt situation deteriorate quickly. As the national government bond markets lacked a backstop, i.e. a central bank willing to provide liquidity in the government bond markets in times of crisis, the self-fulfilling liquidity crises described earlier were set in motion. These self-fulfilling crises had further dramatic effects. They led some countries to be pushed into "bad equilibria" and others into "good equilibria" (see De Grauwe and Ji, 2013).

Good and bad equilibria

The governments of the high-risk bond markets were pushed into a bad equilibrium: the need to find liquidity forced these governments to raise taxes and to reduce spending. These forced austerity programmes in turn made the recession worse and intensified the debt problem of these governments. The governments of the low-risk countries had plenty of liquidity and were spared the need to install severe austerity. All this led to an existential crisis of the eurozone.

It also led to an unsustainable political situation where the creditor countries that had received massive inflows of capital dictated the austerity programmes to the high-risk countries, which suffered twice. Once because the harsh austerity programmes led to unnecessary suffering for millions of people. And a second time because these programmes felt like a foreign intrusion and a humiliation. It became clear that a repetition of this economic and political crisis in the eurozone would lead to its demise.

Post-crisis period

It took the ECB until September 2012 to accept its responsibility: The ECB then announced that it was ready to provide unlimited liquidity support in the government bond markets. This so-called Outright Monetary Transactions (OMT) programme started a process of normalisation during which yields gradually converged again. This convergence was sometimes bumpy, as during the second Greek crisis in 2015. It ultimately led to an almost complete convergence of the yields at the end of 2019.

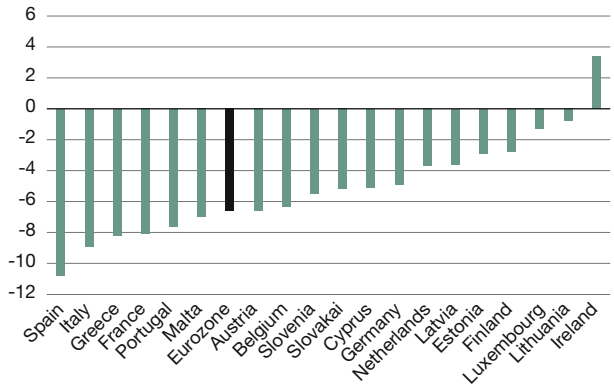
By promising unlimited purchases of government bonds during a liquidity crisis, the ECB took the fear factor out of the market. Suddenly, Greek, Spanish and Italian bonds, whose prices had collapsed as a result of fear of liquidity shortages, appeared to be cheap for private investors. They massively returned to these bond markets, bought the bonds and raised their prices. The spreads collapsed quickly (see Figure 1).

This recovery showed the importance of having a lender of last resort in the government bond markets, i.e. a central bank willing to provide unlimited amounts of liquidity in the government bond markets. In doing so, the ECB actually mimicked what central banks in stand-alone countries do. It also saved the eurozone.

Then came the coronavirus pandemic in 2020. There was a risk that the huge shock that hit the eurozone countries would trigger a new sovereign debt crisis, especially since the high-risk countries in the periphery also appeared to have suffered significantly larger negative effects on their GDP than low-risk countries (see Figure 2).

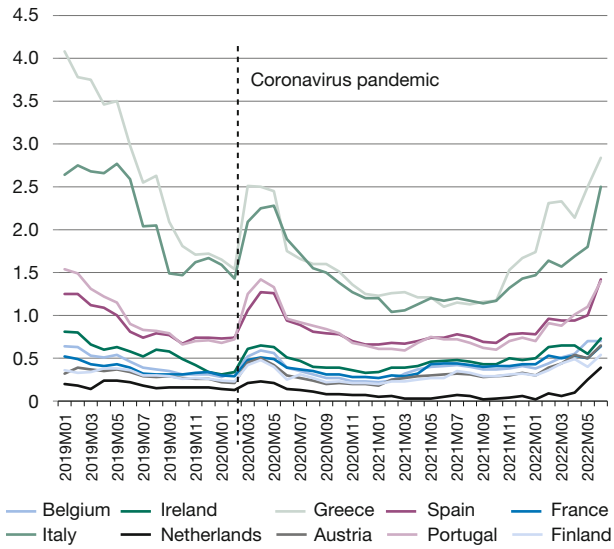
The sovereign debt crisis did not happen. In fact, apart from an early hiccup in the yields of Italy and Greece, the yields continued to converge further (see Figure 3) so that at the end of September 2021 the spreads were even smaller than before the onset of the pandemic (see Candelona et al., 2021).

Figure 2
GDP growth during 2020
in %



Source: Eurostat.

Figure 3
Ten-year government bond spreads, selected eurozone countries, 2019-2022
in %



Source: Eurostat.

Why did the pandemic not lead to a crisis?

Despite the large differences in the economic impacts of the pandemic, this shock did not lead to a new sovereign debt crisis. How did this remarkable result come about? My answer is that the new governance of the eurozone that emerged after the sovereign debt crisis of 2010-12 allowed European policymakers to use new instruments of stabilisation. As a result, the fragility of the eurozone was significantly reduced, thereby making it possible to avoid self-fulfilling crises in the government bond markets. The new instruments that achieved this result were both monetary and fiscal.

Monetary instrument

The ECB's decision to launch the OMT programme in 2012 created the single most important monetary instrument in the stabilisation of government bond markets in the eurozone at that time. This led to the expectation during the pandemic that the ECB would be ready to intervene in times of crises, which pacified markets. The expectation was reinforced by the ECB's announcement of its Pandemic Emergency Purchase Programme (PEPP) in 2020. This was a programme of large-scale government bond purchases by the ECB. The innovation of this programme was the absence of conditionality. While the OMT programme was linked to an austerity programme by governments receiving aid, the PEPP was stripped of any such austerity requirements. This was a remarkable intellectual reversal of the ECB policy towards support of the government bond markets. It was also the correct reversal because the ECB should only intervene in the government bond markets to solve a liquidity crisis triggered by the fear and panic of investors. There is no reason that governments receiving such support should be subjected to the condition that they impose austerity. It was refreshing to see that the ECB learned from past mistakes.

As a result of this new monetary governance, the spreads quickly declined again so that at the end of 2020, they were lower than they were at the end of 2019.

Fiscal instrument

A second major policy innovation was a fiscal one. After much controversy, the European leaders decided in July 2020 to set up a recovery plan amounting to €807 billion. The NextGeneration EU (NGEU) plan was funded by the issue of common bonds. Half of the proceeds of this bond issue were to be used as transfers (not loans) to those countries most hit by the pandemic. This was an important step towards a budgetary union in which a central authority obtains the power to issue debt that is guaranteed jointly by all member countries. It was the first issue of Eurobonds.

This common spending programme financed by the issue of Eurobonds helped instil confidence in the future of the eurozone. It signalled that the path of the monetary union would be one involving further steps towards a budget-

ary union. This was the second reason why the COVID-19 shock did not lead to a sovereign debt crisis.

Today's challenge: Will the surge in inflation lead to a new surge in fragility?

The surge in inflation creates two dilemmas for the ECB. The first dilemma is the traditional one that every central bank, including the ECB, faces after a supply shock. This dilemma can be described as follows: During the past year, major supply shocks occurred – energy and commodity prices increased dramatically, the cost of production increased and inflation surged in most countries as a result. It also led to losses of purchasing power so that production was negatively affected. This is often called stagflation. Stagflation is at the core of the dilemma faced by the central bank. If the latter wants to fight inflation, it will have to raise the interest rate. But this will have a negative effect on production. It may even lead to a recession. If, on the other hand, the central bank wants to avoid a recession, it cannot increase the interest rate too much but then inflation may not easily go down and may become a permanent feature. This leads to a very uncomfortable dilemma for the central bank. Whatever it chooses, the outcome will be painful: Fighting inflation may produce a recession, but fighting a recession may make inflation permanent. Most central bankers have elevated reducing inflation as their primary objective so that it looks likely that they are willing to risk a recession to fight inflation.

The second dilemma is the one that the ECB faces as a central banker of a monetary union (in addition to the one previously mentioned). This second dilemma can be described as follows: When the ECB raises the interest rate, it has very different effects on the long-term bond rates of the different member countries. Every one percentage point increase of the long-term rate of Germany leads to an amplified effect on the long-term rate in high-risk countries. As can be seen from Figure 3, the spreads of Italy and Greece that were close to 1% at the start of 2022 have now moved in the 2.5%-3% range. This is confirmed in Figure 4. Further increases in the interest rate triggered by the ECB's desire to fight inflation could lead to an explosion of the spreads and risk creating a new sovereign debt crisis.

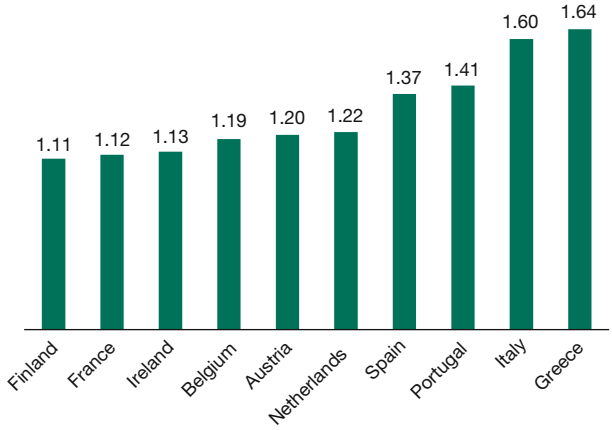
Thus, the second dilemma the ECB faces is the choice between fighting inflation at the risk of creating financial instability in the eurozone, or fighting financial instability at the risk of losing the battle against inflation – an equally uncomfortable dilemma as the first one.

There are two ways out of this dilemma. Both, however, create new discomforts. The first way out consists of a

Figure 4

Change in the yield of the 10-year government bond rates per 1% change of the German bond rate, January to June 2022

in %



Source: Eurostat.

commitment by the ECB to provide an unlimited amount of liquidity to countries experiencing liquidity crises. In fact, in July 2022 the ECB announced a new programme, the Transmission Protection Instrument (TPI), which does exactly that: It provides liquidity to governments experiencing liquidity crises.[1] However, this will create additional liquidity in the system, which will interfere with the central bank's desire to fight inflation. The ECB will therefore have to withdraw liquidity from the system by selling government bonds from low-risk countries (Germany, the Netherlands, Finland). As a result, the ECB will increasingly accumulate high-risk government bonds at the expense of low-risk government bonds. This may create political problems when countries like Germany and the Netherlands resist.

There is a second potential way out of this dilemma. It consists of allowing inflation to increase above the self-imposed target of 2%. Several academic economists have argued that 2% is too low a target and that a target range of 3% to 4% would be more appropriate (see Blanchard, 2010; Ball, 2014; De Grauwe and Ji, 2019), mainly because it would make it less likely that central banks get trapped in the zero-lower-bound syndrome that has made monetary policies so ineffective for so long.

Raising the inflation target would not eliminate the dilemma but it would make it less constraining, thereby reduc-

1 For more information on TPI see https://www.ecb.europa.eu/press/pr/date/2022/html/ecb.pr220721~973e6e7273.en.html.

ing the probability of future crises. This way out from the dilemma, however, would trigger uncomfortable political problems similar to the previous one.

Prospects for the future

Since the sovereign debt crisis of 2010-12, a new governance of the eurozone has emerged. This has made it possible for the eurozone to withstand the major economic disruptions brought about by the pandemic. But a new risk has emerged: inflation.

Will the need to fight inflation with higher interest rates again reveal the fragility of the eurozone? This leads to the question of whether the eurozone has now matured and permanently eliminated its fragile nature.

There is a fundamental contrast between the eurozone and stand-alone countries, i.e. countries with their own central bank. In a stand-alone country, the central bank faces one sovereign, which always prevails in times of crisis. There can be no doubt that in a stand-alone country the central bank will have to provide liquidity when the government faces a liquidity crisis.

In the eurozone, things are very different. The ECB faces 19 sovereigns (20 as of 1 January 2023 with the entry of Croatia), none of which has authority over the ECB. None of these governments can force the ECB to provide liquidity in times of crisis. The decision to provide liquidity support is at the discretion of the central bank. This creates uncertainty about future liquidity support in a monetary union, an uncertainty that is absent in stand-alone countries.

One can have reasonable doubts about the question of whether the ECB will always be ready in the future to provide liquidity support to the sovereigns. Who will be at the helm of the bank in the future? Will the Governing Council that consists mainly of national central bankers always be receptive to the demand of one member country's government for support?

One cannot be sure about this; it stands in stark contrast with the certainty we have that if, for example, the British government were to experience a liquidity shortage, the Bank of England will always step in.

There is thus a fundamental credibility issue about the willingness of the ECB to be a lender of last resort in the government bond markets. This will continue to make the eurozone a fragile construction. As a result, the possibility of a future euro crisis cannot be excluded.

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DOI: 10.1007/s10272-022-1079-9

Intereconomics, 2022, 57(5), 278-282

JEL: E58, H63, H68

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The Euro Area in Between Crises? Considerations on Fiscal Policies and Rules

Fiscal and monetary policy in the euro area acted jointly and forcefully during the COVID-19 pandemic. This allowed economic output to recover to its pre-crisis level faster than many had initially expected given the depth of the blow to the euro area economy. But the support from fiscal policies came at the cost of higher public indebtedness. With monetary policy heading towards normalisation as inflation is at the highest level in decades and the war in Ukraine is on the EU's doorstep, the challenges for fiscal policies at the current juncture are manifold and give rise to some non-trivial trade-offs. They need to continue cushioning the impact from the Russian war against Ukraine and bolster potential output, while not adding to inflationary pressures and debt sustainability risks. The challenges become even more demanding with the deepening of the energy crisis and the continuing deterioration of the economic and inflation outlook. Recent financial market volatility indicates that challenges for fiscal policies are perceived to differ across countries and be related to structural and fiscal vulnerabilities.

This article argues that fiscal policy has an important role to play in shielding the euro area from another crisis. Its tasks are different from those ahead of the euro area sovereign debt crisis, including in the highly indebted countries. But they are neither less nor simpler. To this end, the article stresses the importance of a fiscal framework that is conducive to counter-cyclical fiscal policies, while anchoring expectations that vulnerabilities from high government indebtedness will be gradually yet firmly reduced. To improve the functioning of fiscal rules, it highlights the importance of having the fully independent assessments by strong institutions.

Open Access funding provided by ZBW – Leibniz Information Centre for Economics.

* The views expressed in this paper are those of the authors and do not necessarily reflect those of the European Central Bank. The authors would like to thank Oscar Arce and Mar Delgado Tellez for helpful comments as well as Johannes Simeon Bischl for data support.

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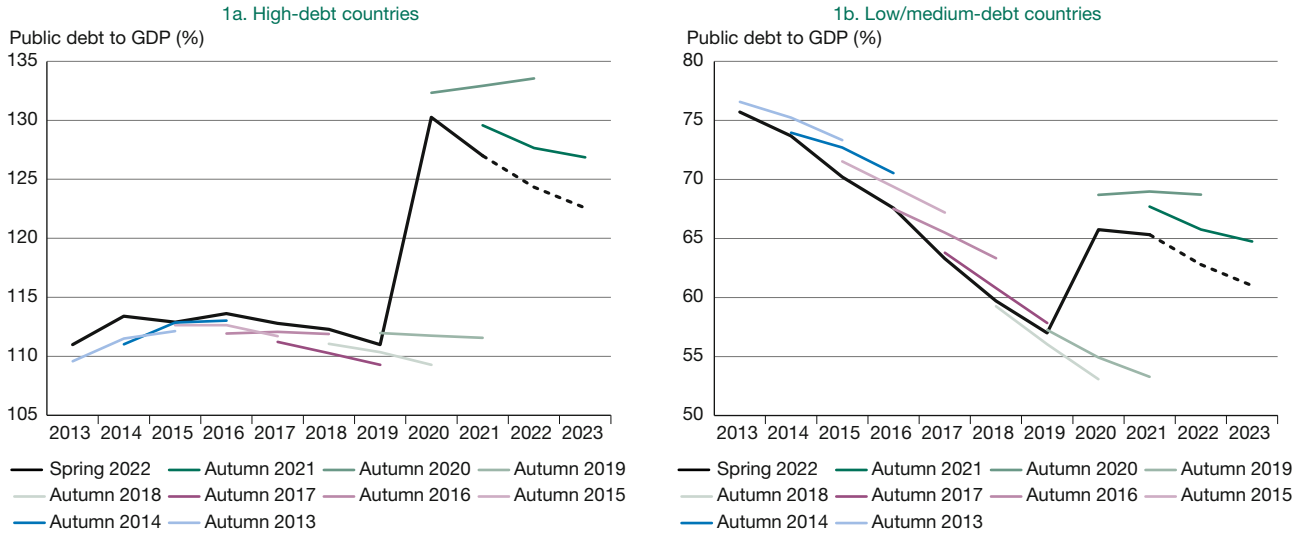
The fiscal response to the pandemic and the war in Ukraine

When the pandemic struck in early 2020, governments were quick to respond in a comprehensive manner at both the national and EU level. This was a new and very different crisis – a health and humanitarian crisis, not one induced by macroeconomic, financial or fiscal imbalances. At the national level, euro area governments implemented emergency and recovery stimulus measures worth about 4% of GDP in 2020 and an additional 0.7% of GDP in 2021. At the EU level, agreement was reached on Next Generation EU, comprising funds worth €750 billion (in 2018 GDP levels) to be spent over 2021-26. Jointly with an accommodating monetary policy, comprehensive support from fiscal policies contributed to an economic recovery that allowed the euro area to surpass its pre-crisis real GDP level in Q4-2021, earlier than many had anticipated. But this came at the expense of higher government indebtedness.

When the Russian war against Ukraine started on 24 February 2022, the euro area economy was thus in a less favourable fiscal position than ahead of the pandemic. In addition, the war brought about an acceleration of energy price increases and pushed inflation to levels not seen in decades, triggering the start of monetary policy normalisation. Once more, fiscal policies were prompt to react to yet another challenging macroeconomic situation. Sizeable fiscal policy measures were enacted to cushion the impact from the war in Ukraine. According to the September 2022 ECB staff projections,[1] euro area discretionary budget support in response to the war in Ukraine is estimated at 1.2% of GDP for 2022. Around 85% of this support is assessed to represent compensatory measures related to increasing energy prices, with the rest relating to defence spending, refugee support and other measures. Based on the government measures approved by early September, one-third of the stimulus is expected to

1 For more details on the measures, based on June 2022 Eurosystem staff projections, see Checherita-Westphal et al. (2022).

Figure 1
Government debt paths in euro area countries – forecasts and outcomes



Notes: The government debt outcome (black line) and latest forecast for 2022-23 are taken from the European Commission (EC) Spring 2022 forecast. The coloured lines represent government debt paths as forecast in the EC autumn vintages of the respective year for T; T+2. The (GDP-weighted) aggregate of high-debt euro area countries includes countries with the 2019 government debt-to-GDP ratio above 90%: BE, GR, ES, FR, IT, CY, PT. The (GDP-weighted) low-debt aggregate includes the remaining euro area countries.

Source: Authors' calculations based on European Commission's data and forecast.

continue in 2023, with a large part of the energy support reversing in 2023. Yet, new measures or extensions of the old ones in response to the increasing cost of living are planned or have been already approved by many governments ahead of the Parliamentary debates over their 2023 budgets. The war-related measures currently in the baseline are estimated to have a tangible macro impact. At the euro area aggregate, they are forecast to raise GDP growth by 0.5 percentage points in 2022, with the effect fading out in 2023, and to lower HICP (Harmonised Index of Consumer Prices) inflation by 0.6 percentage points with this impact broadly reversing in 2023.

Most of these measures are estimated to be debt-financed, with some amounts intended to be covered through revenues from the EU Emissions Trading System and relatively limited (albeit more being currently planned) offsetting discretionary measures. On the positive side, better-than-expected cash revenue collections in many countries in the first half of 2022 contribute to lowering the initially forecast deficit impact.

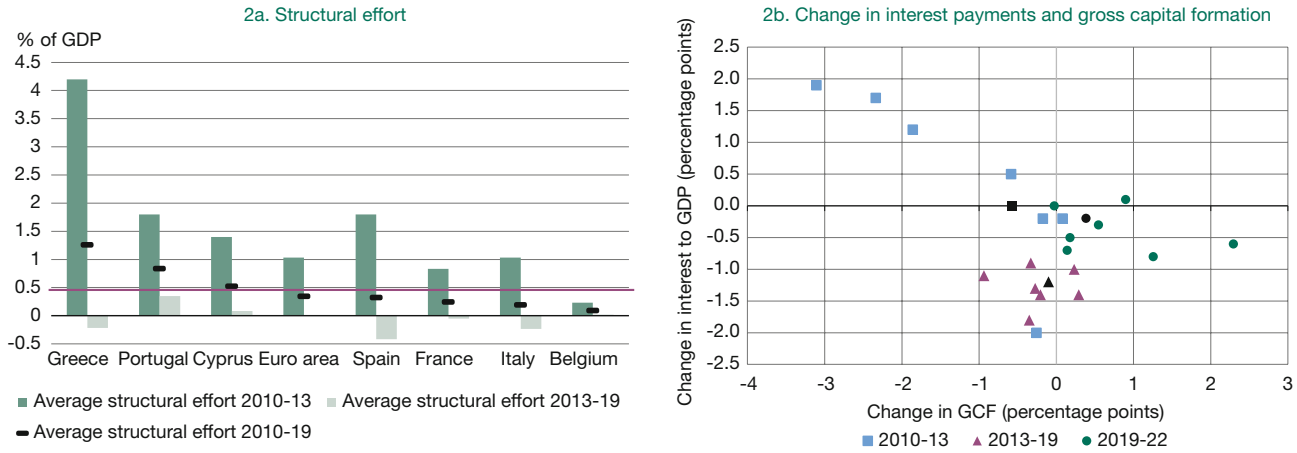
Beyond the measures implemented at the national level, the euro area is estimated to absorb grants from the Next Generation EU programme, especially for a green and digital transition, of 0.6% of GDP in both 2022 and 2023, after about 0.3% of GDP in 2021. These grants do not raise national deficits or public debts immediately, but do raise debt at the EU level. This EU debt will need to be repaid over the longer run.

Challenges for fiscal policies

The challenges for fiscal policy that arise from a weak macroeconomic outlook, high inflation and elevated debt levels obviously differ across countries. Recent financial market volatility indicates that challenges for fiscal policies are perceived to relate to vulnerabilities from very high government debt, in particular. Countries with elevated government debt-to-GDP ratios will need to focus on improving fiscal sustainability, which will require both sizeable, though gradual, fiscal adjustments as well as solid and sustained growth over the medium term.

This is easier said than done. Looking back at the past decade, Figure 1a shows that highly indebted countries (defined as having recorded a pre-pandemic debt-to-GDP ratio above 90%), on average, struggled to firmly lower public debt ratios even in more normal times following the sovereign debt crisis. As shown in the figure, their debt path was broadly flat over 2013-19, while countries with low and medium levels of indebtedness managed to bring debt ratios on a sustained downward trajectory. In fact, government debt paths in the higher indebted countries, on average, turned out to be consistently above forecasts (while the opposite holds, on aggregate, for the

Figure 2
Structural adjustment, interest payments and public investment in selected euro area countries



Notes: The figures show countries with public debt-to-GDP ratios above 90% in 2021. In Figure 2a, the horizontal line refers to the Stability and Growth Pact's benchmark requirement of structural effort, i.e. 0.5% of potential output. In Figure 2b, the black points refer to the euro area aggregate, while the other points refer to the higher-debt countries, as identified in Figure 2a (all points denote average values over the periods shown in the legend). GCF stands for public sector's gross capital formation.

Source: Authors' calculations based on European Commission's data and forecast.

remainder euro area countries). This limited debt reduction also reflects rather small or in part negative structural efforts during this period (see Figure 2a), which followed the sizeable and painful adjustments during 2010-13. Once the pandemic hit in 2020, indebtedness increased significantly in the high-debt countries (and far more than in the rest of the euro area).

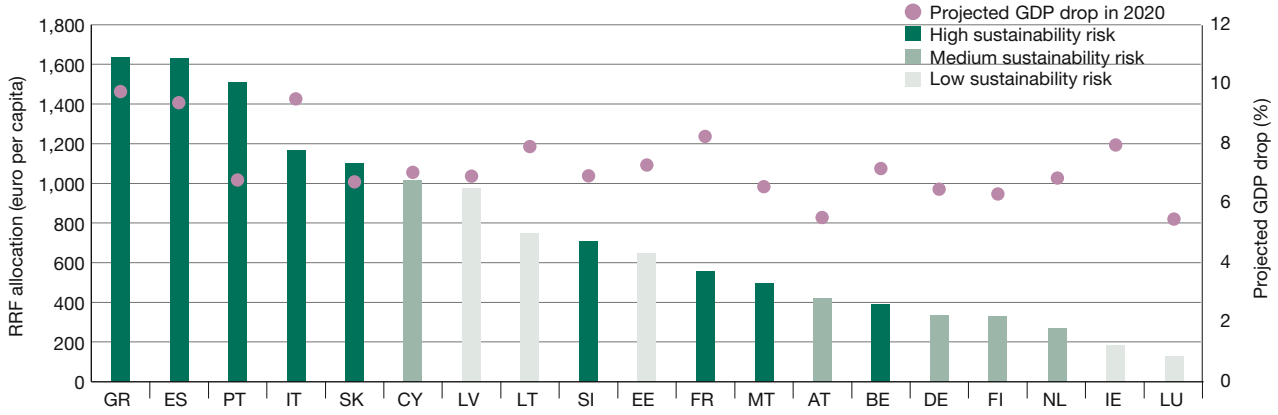
By contrast, in 2021, once the euro area learned to live with the pandemic and forged itself out of the crisis, debt ratio developments were relatively more favourable in the more indebted countries, due to strong denominator effects related to the exceptional rebound in nominal growth. As shown in Figure 1, debt ratio outcomes during the immediate euro area's post-pandemic economic rebound generally surprised on the positive side, turning out lower than forecast.

The important role of economic growth in supporting debt reductions is a reminder that episodes of fiscal consolidation should keep the economy's growth potential intact. Maintaining or even expanding public and private investment, accompanied by growth-enhancing structural reforms, is vital for safeguarding potential output and thus debt sustainability. This is a major lesson from the sovereign debt crisis, which during 2010-13 saw reductions in gross capital formation as interest spending rose on increasing debt ratios (see Figure 2b). However, despite the more normal economic times over 2013-19, the persistent decline in interest expenditure was not used to raise gross capital formation in many more highly indebted countries. In fact, by 2019, several governments' public investment-to-GDP ratios were below their levels in 2013.

According to the European Commission's 2022 spring economic forecast, the trend decline in government investment in more highly indebted countries appears to have come to a halt. For 2022, in several of these countries, the level of gross capital formation in percent of GDP is expected to be higher than in 2019, although the decline in interest spending is forecast to end. This favourable development is also a reflection of the impact of Next Generation EU, the main instrument of which, the Recovery and Resilience Facility (RRF), is benefiting some higher indebted countries. Figure 3 shows that the per capita allocation of RRF grants is tilted towards countries, which, according to the Commission's most recent assessment, are subject to relatively larger risks to debt sustainability (European Commission, 2022).

These positive developments are subject to two major risks though. First, the share of governments' budgets that will need to be allocated to interest spending is likely higher than forecast in the Commission's 2022 spring economic forecast as monetary policy continues its path towards normalisation in light of historically high inflation. This may put downward pressure on planned government investment that is unrelated to the RRF. Second, the absorption of grants under the RRF may turn out to be less than initially expected. So far, there is mainly anecdotal evidence that some governments are having difficulties absorbing the EU funds that they have been allocated. The

Figure 3
Recovery and Resilience Facility allocation per capita and fiscal sustainability, euro area countries



Notes: Medium-term fiscal sustainability risks according to the European Commission's 2021 Fiscal Sustainability Report. Projected GDP drop denotes the real GDP growth rate for 2020 (inverted scale) according to the European Commission Spring 2020 forecast.

Source: Authors' calculations based on European Commission's data and forecast.

main hurdles appear to be related to constraints in administrative capacity, supply bottlenecks in the current post-pandemic recovery and energy crisis, as well as the need to redraft public procurement due to higher than initially planned costs of energy. Moreover, in light of rising interest rates, loans are also becoming more expensive under the RRF.[2] While the relative cost compared to nationally-issued debt may still be lower for some countries, this is likely to reduce countries' already contained incentives to make use of them. This would further deteriorate the outlook for RRF-related investment.

A particular challenge for fiscal policies in the euro area at the current juncture relates to the high inflation environment. Different from the fiscal response during 2008-13, the impact of high inflation especially on households with low incomes requires governments to provide them with support beyond the usual automatic stabilisers that start working as the economy slows and unemployment rises. Where additional public support is required to cushion the impact from the war in Ukraine and from high inflation, financial resources should be used efficiently. In particular, in order to avoid contributing to aggregate demand and high inflation, fiscal measures need to be temporary and increasingly targeted at compensating the most vulnerable households from excessive increases in the cost of living.[3] Generally, increasing the resilience to future shocks in this difficult economic and social environment may require governments to resort to policies that have already proved difficult in the past. Beyond this, more innovation eased by structural reforms, including that which reduces bureaucracy, will be elementary for raising potential output growth and thus fiscal sustainability. The current challenges related to, inter alia, climate change should provide a natural boost for more innovation and investment, including from the private sector.

The role of the fiscal framework

A well-functioning fiscal framework is an important ingredient for sound fiscal policies. It appears particularly important in times of high uncertainty and in the presence of vulnerabilities to shocks. Such a framework can support fiscal policies in two important respects. First, if credible, it can anchor expectations that high government debt will be brought down gradually yet firmly. Second and related, it can ensure that fiscal policies maintain sufficient counter-cyclical properties. There is broad-based agreement that the functioning of the EU's Stability and Growth Pact

2 Next Generation EU (NGEU) allows the EU to issue a significant volume of debt at the European level. Specifically, the issuance of new NGEU debt takes place between mid-2021 and 2026 in the form of bonds of up to €150 billion. The Commission takes a role in the capital markets as a major provider of safe (AAA-rated) assets denominated in euro. For more details, see Bankowski et al. (2022).

3 This includes a review of whether some more broad-based measures enacted to tackle the crises are still warranted and/or adequate. For the time being, only about 10% of the total energy measures included in the September 2022 ECB staff projection baseline (in terms of their budget impact at the euro area aggregate) are assessed to be specifically targeted to low-income households (means-tested). Discussions are currently on-going in many countries to make this support better targeted to the most vulnerable households.

(SGP) can be improved. In particular, it could better ensure that economic good times are used to build buffers, thereby reducing vulnerabilities from high government debt and creating scope for more counter-cyclicality.

The EU's economic governance review,[4] which the Commission launched in February 2020, has resulted in a broad-based discussion on avenues for reforms. An important element of this debate is how the effectiveness of the fiscal framework can be improved. The reform of the EU's fiscal framework in 2011 foresaw a strengthening of the European Commission in enforcing the fiscal rules via the principle of reverse qualified majority voting in the Council in case member countries disagreed with the recommendations from the Commission. However, in the end, this reform has made it more difficult for the Commission to put forward decisions under the SGP that are unpopular in the Council and thus likely to be rejected. Therefore, a promising avenue for improving the implementation of an economically meaningful framework of fiscal rules that has sufficient ownership across the EU member states is more recourse to an independent assessment by the national fiscal Councils and at the EU level through the European Fiscal Board.[5]

There is evidence that a stronger role of Independent Fiscal Institutions (IFIs) matters (Căpraru et al., 2022; Beetsma et al., 2019). For example, their role in scrutinising the macroeconomic forecasts underlying countries' stability and convergence programmes, which came with the so-called 2-pack regulations, has raised these projections' reliability. In this respect, IFIs tasks could be extended to, inter alia, also include the cost of budgetary measures. Generally, any reduction in the density of common fiscal surveillance at the EU level that is accompanied by more accommodation for country-specific eventualities would benefit from a strengthened role of IFIs. In this context, Barnes (2022) argues in favour of increasing the scope of involvement of national IFIs in the implementation of the EU fiscal governance framework, advocating also that the EU level should be legally required to take into account the assessment of national IFIs. A more effective involvement of national IFIs will take time, however, given the existing large heterogeneity of the scope and capabilities of these institutions.

Conclusion

Fiscal policymakers in the euro area are facing extraordinary challenges in a low-growth, high-inflation environment. Significant investment needs arise from, inter alia, the green and digital transitions. The war in Ukraine adds to these challenges in the short and longer term. At the same time, several countries are fiscally constrained due to debt ratios standing at record highs following the COVID-19 pandemic. With the ongoing monetary policy normalisation putting upward pressure on interest rates, anchoring market expectations regarding public debt sustainability has become an additional policy objective in high-debt countries. In this context, this article argues that a reformed SGP framework that effectively supports counter-cyclical fiscal policies, notably the building of buffers in good times, will be conducive to macroeconomic stability in the EMU. Credibility of the revised fiscal rules will be crucial so that vulnerable countries can benefit from confidence effects. National ownership will be key in that respect and can be supported via a stronger role of independent national fiscal institutions.

4 See European Commission (2021). In its Communication, the Commission reiterated that the European fiscal framework should ensure debt sustainability while promoting sustainable growth through investment and reforms. To that end, fiscal surveillance should pay more attention to the medium term, also drawing on the insights from the governance and operation of the RRF. The Commission also stressed that the rules should become simpler with stronger national ownership and better enforcement as key objectives.

5 Also the International Monetary Fund, in a recent contribution to the debate, emphasised the need for a reinforcement of the link between European fiscal rules and national budget implementation, notably through enhanced mandates of national independent insitutions. See Arnold et al. (2022).

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DOI: 10.1007/s10272-022-1080-3

Intereconomics, 2022, 57(5), 283-287

JEL: F42, H63

Robin Brooks and Jonathan Pingle

The Euro Area Periphery Debt Conundrum

In the wake of the COVID-19 pandemic, a discussion has begun on reforming Europe's fiscal rules. This is an important debate, and there are many good reasons to make changes. Indeed, Brooks and Fortun (2020) laid out the problems with conventional output gap estimates, which – in our view – drastically understate slack in some periphery countries. That is a critical issue for Europe's fiscal rules because output gaps are used to cyclically adjust fiscal deficits. Gap estimates that are too small, i.e. that understate slack, may therefore promote fiscal policy that is too tight.

While this issue remains important on a conceptual level and will eventually need to be addressed, it has also been overtaken by a number of recent events. The coronavirus pandemic meant that Europe's fiscal rules were suspended to permit large deficits. Debt issuance soared – for understandable reasons – and debt levels are now much higher than just a few years ago. The most important issue, however, is financing. Large budget deficits on the euro area periphery ended up being financed almost entirely by the European Central Bank (ECB), which – via quantitative easing (QE) – bought much of the periphery debt issuance. Indeed, ever since ECB QE began in early 2015, it has been the case that the ECB constitutes the most important buyer of net new debt issuance on the periphery; the COVID-19 pandemic only extended and accentuated a trend that was already building.

ECB purchases have permitted low interest rates, which has made large debt burdens manageable. But low interest rates have an adverse side effect. They drive away private buyers, who see low yield levels as incompatible with perceived risks. Indeed, foreign buyers have been cashing out of periphery debt for the past decade. It is also possible that low interest rates discourage needed structural reforms in the euro area periphery and embolden populist politicians, who come to see de facto spread control as a safety net. This is the euro periphery debt "conundrum." On the one hand, low interest rates are needed to keep things going. On the other hand, they make it harder to ever exit an equilibrium where the ECB is increasingly on the hook for deficit financing.

The solution lies not in withdrawing ECB support. That would only restart the eurozone debt crisis that had such deleterious effects a decade ago. The solution instead is to couple ECB assistance with a renewed emphasis on hard structural reforms, which will boost medium-term growth prospects and make it easier for periphery countries to withstand the global rise in yields. That means a return to conditionality and confronting politically difficult issues like Italy's segmented labor market. In the end, there is no way to get around structural reforms. They must be part of the solution for Europe.

How we got here

During the early period of the European debt crisis, there was a tug of war between northern Europe, which emphasised the need for "structural reforms," and southern Europe, which saw these reforms as an intrusion on its sovereignty. When the ECB took its first steps to help Italy and Spain a decade ago, it was in the context of conditionality. This is clear looking at the Trichet-Draghi letter. On August 5, 2011, ECB President Jean-Claude Trichet and his designated successor Mario Draghi sent a confidential letter to the Prime Minister of Italy. The letter called for a series of economic reforms implicitly conditioning the central bank's purchases of Italian bonds, putting an end to the "trust that the Government will take all the appropriate actions" (Trichet and Draghi, 2011). Later, when the Securities Market Program (SMP) ended and the Outright Monetary Transactions (OMT) program was announced, the ECB made OMT assistance conditional on a country's participation in a European Financial Stability Facility/European Stability Mechanism (EFSF/ESM) program, a way to link ECB help with conditionality and structural reforms (European Central Bank, 2012b). In fact, in the press conference announcing OMT, Draghi stated that "If the central bank were to intervene without any actions on the part of governments, without any conditionality, the intervention would not be effective and the Bank would lose its independence" (European Central Bank, 2012a). Overall, while the eurozone crisis saw the ECB take its first steps as a provider of assistance, there was a strong sense of conditionality to that role.

Open Access funding provided by ZBW – Leibniz Information Centre for Economics.

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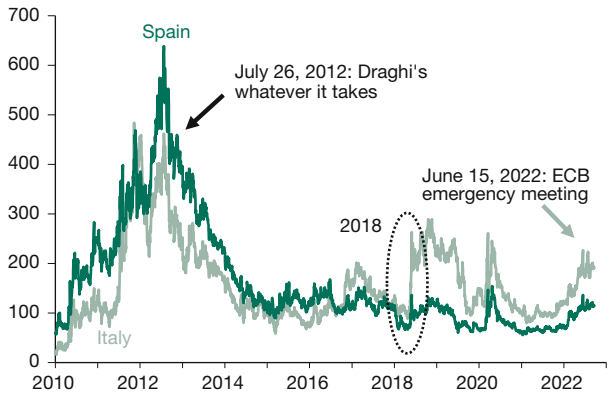
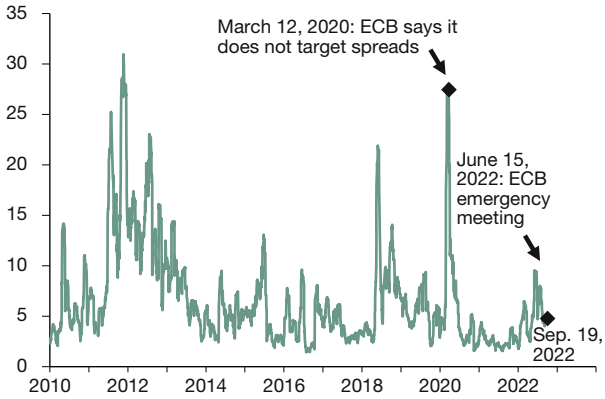
Figure 1
Spread of 10-year sovereign bonds over Bund
in basis points



Source: Bloomberg.

Figure 2
Standard deviation of daily changes in spread on Italian 10-year BTPs over German Bunds
20 day rolling window



Source: Authors' calculations; Bloomberg.

The tug of war between northern and southern Europe effectively ended on July 26, 2012, when then ECB President Draghi made his now famous "whatever it takes" comment at a speech in London (European Central Bank, 2012c). That comment is certainly understandable. Market disruption in periphery bond markets was extreme at the time and people were openly speculating about a break-up of the eurozone (Figure 1). But this comment also had a material side effect. It had the unintended consequence that momentum for structural reforms – and the pressure from markets to pursue politically painful reforms – effectively ceased. What followed were years of ECB QE in the context of low inflation, which – since this was an effort to ease monetary policy on a broad basis across the eurozone – came without strings attached. While low inflation certainly justified QE, it also fed an expectation in some countries that sovereign bond purchases – without conditionality – are the norm, not the exception.

We think recent events help to put that shift into perspective. In the aftermath of the COVID-19 pandemic, global inflation has risen sharply, along with interest rates around the world. That puts pressure on highly indebted countries, given that markets tend to price higher risk premia as global rates rise. Over the course of 2022, rising risk premia widened out the spread on Italian sovereign bonds over German Bunds. That ended on June 15, 2022, with an emergency ECB meeting, which set the stage for an unveiling of the Transmission Protection Instrument (TPI) in July. While these events were unfolding, the ECB was using proceeds from maturing government bonds bought under its COVID-19 QE program to buy Italian and Spanish bonds; this was, in effect, a form of spread control. This is perhaps best visualized by looking at the volatility of Italy's spread over time. Even in the run-up to the pivotal September 2022 election, volatility is very low, an indication that some form of spread control is likely in place (Figure 2).

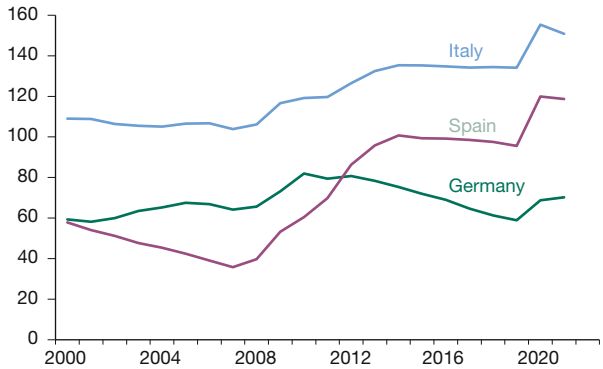
The pandemic has burdened the euro area periphery with higher debt levels, which – in a rising interest rate environment – carry the risk of absorbing more and more government resources. The need for the ECB to play a role is therefore hard to dispute. The issue is more about how that support is given and whether it comes with strings attached, i.e. whether it is time to re-emphasize conditionality and structural reforms.

Deficit funding and the ECB in the aftermath of the COVID-19 pandemic

Debt levels were already diverging in the run-up to the coronavirus pandemic. Government debt in percent of GDP was on a rising trend in Italy and Spain: flat in good times and rising in bad ones. Large deficits during the pandemic exacerbated this trend, shifting debt levels materially higher. Germany's debt brake has made it an outlier. Before 2020, German debt-to-GDP levels were on a consistent downward trend (see Figure 3) and – even with large deficits during the pandemic – are no higher now than a decade ago. A similar trend can be found in the average maturity of debt. Many countries have worked to extend the average residual maturity of outstanding government debt as global interest rates have fallen. Italy is below where it was a decade ago (Figure 4), a sign that issuance gravitated to shorter maturities due to weak demand at longer maturities.

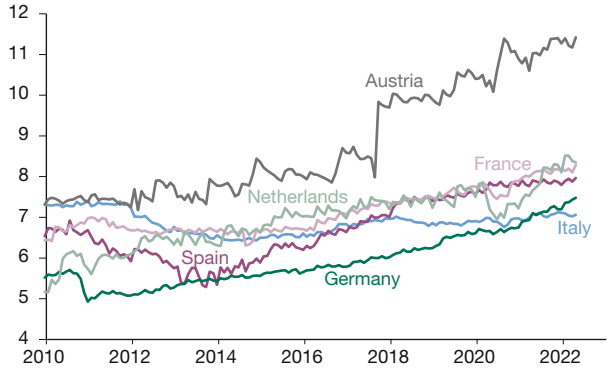
This weak demand situation is reflected in the composition of demand for net new debt issuance by governments. The bulk of funding for euro area periphery issuance in the past decade has come from the ECB. When the ECB announced

Figure 3
General government gross debt
in % GDP



Source: IMF fiscal monitor, April 2022.

Figure 4
Average residual maturity of government debt
in years



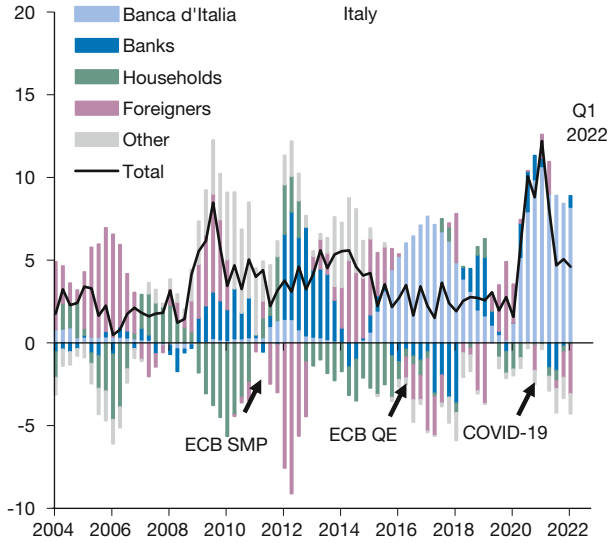
Source: European Central Bank.

the expanded asset purchase program to include sovereign bonds in early 2015, inflation was low and had remained low until recently (European Central Bank, 2015). With European inflation currently at its highest levels in history, the solidified dependence on ECB funding has become an issue.

Figures 5 and 6 highlight the issuance of government debt versus demand by sector for Italy and Spain, respectively. As shown, the public sector purchase program (PSPP) and purchases during the pandemic have accounted for most of the demand for government debt in these two countries. During these periods, there has been little demand and even outflows from foreign and domestic private investors. Before ECB QE, new issuance was demanded by a healthy mix of sectors, while at lower yields, it has become dominated by ECB demand.

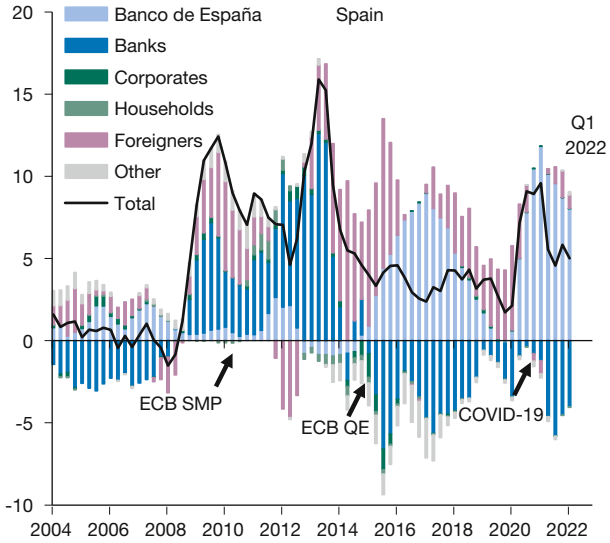
Figures 7 and 8 show the same issue in debt level terms. They show that net new issuance has been absorbed entirely by the ECB over the past decade, while foreign demand and demand from domestic sources has been weak. The overall picture is therefore that low yields can be somewhat deceptive. Yields are low, but that is due almost entirely to ECB buying, not strong private sector demand. The euro area periphery debt conundrum is therefore how to bring private investors back as a

Figure 5
Issuance of Italian government bonds vs demand by sector
in % GDP 4-quarter moving average



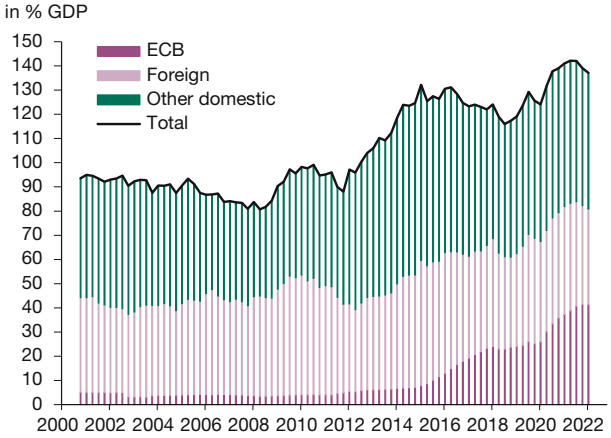
Source: Authors' calculations; Bank of Italy.

Figure 6
Issuance of Spanish government bonds vs demand by sector
in % GDP 4-quarter moving average



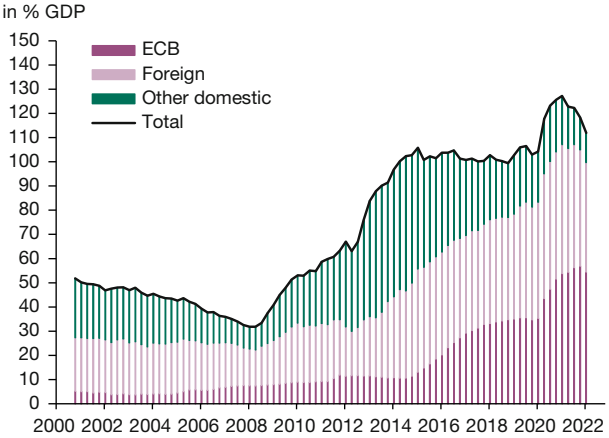
Source: Authors' calculations; Bank of Spain.

Figure 7
Italian government debt by holder



Source: Authors' calculations; Bank of Italy.

Figure 8
Spain government debt by holder



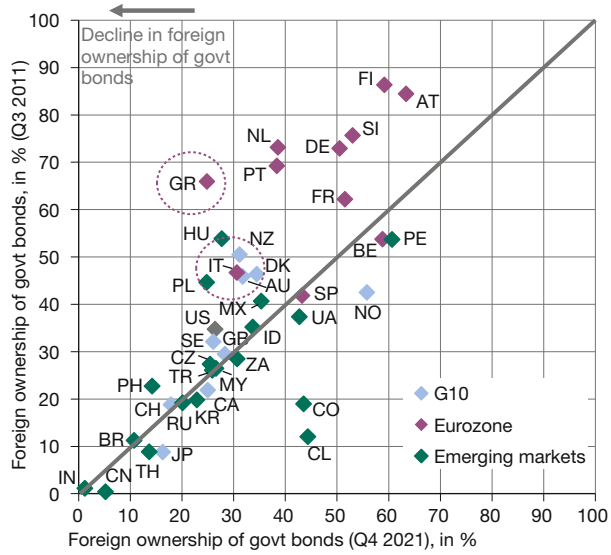
Source: Authors' calculations; Bank of Spain.

source of demand for net new issuance. That is something the ECB cannot do alone. Only a reemphasis on structural reforms can achieve that.

Weak foreign demand as the canary in the coal mine

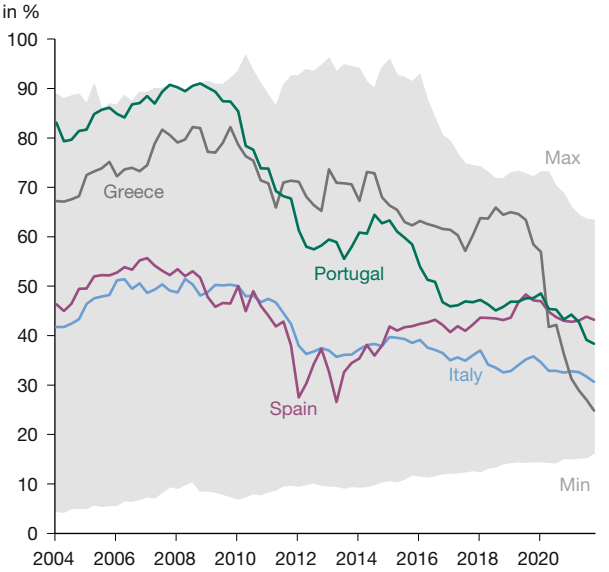
As the least encumbered investors, not bound by domestic regulations, foreign investors have an easier time entering and exiting. When foreign investors do not like the yield level relative to perceived risk, they leave. Jalles (2018, 397), looking at the euro area, found that "improved fiscal positions, systemic stress and financial volatility, a strong business cycle position, all increase share of public debt held by non-residents." Foreign ownership of euro area periphery debt has been falling, especially for Italy and Greece (see Figures 9 and 10). This lack of foreign demand – by investors who are less encumbered than domestic ones – is a canary in the coal mine. Low yield levels are only a temporary solution, if – one day – the goal for the ECB is to step back from sovereign bond buying.

Figure 9
Foreign ownership of government bonds, Q3 2011 vs. Q4 2021



Source: IMF Sovereign Debt Investor Base.

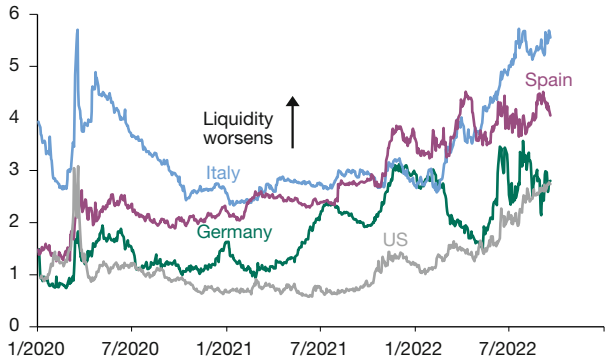
Figure 10
Foreign ownership of government debt across all advanced economies



Note: Last data point: Q4 2021.

Source: IMF Sovereign Debt Investor Base

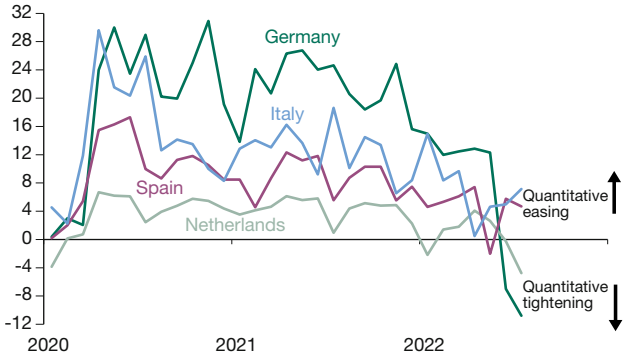
Figure 11
Bloomberg index for liquidity in government bonds



Source: Bloomberg.

Figure 12
Monthly ECB QE purchases of sovereign bonds

in billion euros



Notes: Last data point: July 2022.

Source: European Central Bank.

The rise in inflation in the aftermath of the COVID-19 pandemic is unearthing these vulnerabilities. Euro area periphery spreads have widened, especially Italian sovereign bonds over Bunds, as noted earlier (Figure 1). The deteriorating health of the bond market is especially visible in the decline in bond market liquidity. This decline in liquidity is measured as kinks in the yield curve relative to a theoretical, smooth yield curve, and, as displayed in Figure 11, is especially pronounced for Italy.

This deterioration in liquidity is happening despite continued, large ECB purchases of Italian sovereign bonds, even after QE has ended (Figure 12). This is due to reinvestments of maturing bonds bought under the pandemic emergency purchase programme (PEPP). Given the size of PEPP purchases, numerous bonds – especially for Germany – are maturing, which the ECB is using to purchase Italian debt. That is helping to keep the Italian spread well anchored, even in the run-up to the pivotal September 2022 election in Italy.

Conclusions

There are many reasons to reform the Stability and Growth Pact, but that reform is no panacea. This is because the euro area periphery has increasingly entered a debt conundrum. It needs low interest rates for debt to be sustainable, which the ECB provides via purchases in one form or another. But low interest rates reduce the urgency for reform, with the risk that the periphery does not exit this equilibrium.

Events in mid-2022 bear out this conundrum. When Italy's spread rose modestly in the early part of the year, an emergency ECB meeting was called. Subsequent events, such as the unveiling of the TPI and large PEPP reinvestments, have kept a lid on yields, but have also – arguably – stymied any debate on what is needed to exit this state of affairs. That was especially notable in the run-up to Italy's election, where "lo spread" essentially played no role. One would expect, after so many years of ECB sovereign bond buying, an eagerness to exit this equilibrium. There is not.

We do not advocate an end to ECB sovereign bond buying. That would take the eurozone back to the dark days of the periphery debt crisis in 2011-12. We do think, however, that the eurozone needs a plan to get out of the debt conundrum. If low yields depend entirely on ECB buying, that means the ECB is permanently on the hook for sovereign bond purchases. Indeed, in the context of recent reinvestments, those purchases are only for a few countries, notably Italy. Over the medium term, the risk is that this is politically unsustainable and will breed resentment in northern Europe, where voters value a clear separation of monetary and fiscal policy. The only way to exit this conundrum is to pursue growth-enhancing reforms. Structural reform is the way to do that.

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DOI: 10.1007/s10272-022-1081-2

Intereconomics, 2022, 57(5), 288-292

JEL: F36, H63, H68

Michala Marcussen*

Euro Conditionality Hinges on Positive Convergence

The pandemic and the horrific war in Ukraine are profoundly reshaping the global economy, raising questions on strategic autonomy, energy systems, digitalisation and organisation of global supply chains. These shocks have returned inflation in the advanced economies to levels reminiscent of the 1970s and added to already elevated debt levels.

The present cocktail of a bleak economic outlook combined with high inflation and rising interest rates has raised questions as to whether a new euro debt crisis might emerge. Euro area sovereign spreads have widened, but not to "unwarranted" levels, unlike the situation that prevailed during the European debt crisis. A replay of the funding fears, which drove the euro area debt crisis a decade ago, seems unlikely today with the extensive toolkit now in place. This toolkit, however, comes with two interlinked challenges: the effective management of the ECB's balance sheet and the democratic acceptability of conditionality.

Once the euro area debt crisis faded, so too did the sense of urgency to complete the banking union and deepen the capital markets union, commonly agreed necessary to foster positive convergence. This is a concern as the cornerstone of conditionality, which underpins the toolkit keeping euro area spreads in check, ultimately depends on economic growth. The present energy and climate crises offer an opportunity to put positive euro convergence back on track; however, this requires not only a favourable outcome from the ongoing overhaul of the EU fiscal framework, but also the completion of Europe's financial architecture to secure a sufficient flow of private capital.

"Unwarranted" spread widening unlikely

Euro area spreads have been widening again since late 2021, with Italy centre stage in the market debate, not only due to concerns about high general government debt levels, but also due to the sheer size of the Italian bond market, ranking among the largest in the world.

Top of the list of factors driving this spread widening is a weak economic growth outlook, combined with higher inflation expectations. This configuration is observed across the euro area, leaving the European Central Bank (ECB) with the difficult task of taming inflation, without plunging the euro area into a painful recession. This challenge is not unique to the euro area but observed across several of the major advanced economies, and not least the United States. Other major advanced central banks, however, do not face the same challenge as the ECB in leaning against "unwarranted" sovereign spread widening.

In contrast to the debt crisis of a decade ago, the euro area today has a far more effective toolkit at hand, with the establishment of the European Stability Mechanism (ESM) in 2012, the banking union (set in motion in 2012, albeit still incomplete) and several new ECB instruments. Taking quick stock of the ECB instruments, back in June 2012, then ECB President Mario Draghi promised to do "whatever it takes" to preserve the integrity of the euro, and soon afterwards the ECB delivered Outright Monetary Transactions (OMT), backed by the strict conditionality of an appropriate European Stability Mechanism (ESM) programme for member states in need of eventual support. The ECB went on to demonstrate that it could also conduct quantitative easing, with large scale purchases of government bonds, just like its global peers, to ensure sufficiently accommodative monetary policy.

When the COVID-19 pandemic struck in early 2020, the ECB introduced the Pandemic Emergency Purchase Programme (PEPP), which allowed purchases to be "conducted in a flexible manner on the basis of market conditions and with a view to preventing a tightening of financing conditions that is inconsistent with countering the downward impact of the pandemic on the projected path of inflation" (ECB, n.d.). Net asset purchases were discontinued in March 2022, but the ECB plans flexible reinvestment of securities maturing under PEPP at least until the end of 2024 (ECB, 2022b). On 21 July 2022, the ECB further strengthened its arsenal with the new Transmission Protection Instrument (TPI), backed by the conditionality of a cumulative list of criteria, including compliance with the EU fiscal framework (ECB, 2022c). Like the OMT, TPI purchases are not restricted *ex ante*, and the Eurosystem accepts the same (*pari passu*) treatment

Open Access funding provided by ZBW – Leibniz Information Centre for Economics.

* The views expressed are attributable only to the author and to not any institution with which she is affiliated.

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as other creditors. Both programmes, moreover, allow for such purchases to be sterilised.

TPI purchases, however, have the additional flexibility of being able to purchase public sector securities with a remaining maturity of one to ten years, compared to one to three years for the OMT, and do not require the conditionality of an ESM programme. Importantly, the ESM Treaty notes that "In accordance with IMF practice, in exceptional cases an adequate and proportionate form of private sector involvement shall be considered in cases where stability support is provided accompanied by conditionality in the form of a macro-economic adjustment programme" (ESM, 2012). The TPI makes no mention of private sector involvement.

As recently observed by Edward Scicluna, Governor of the Central Bank of Malta, in commenting the TPI in Eurofi, "While there are clear monetary policy justifications for this instrument, drawing the line between warranted and unwarranted interventions represents a major challenge" (Scicluna, 2022). This author can only agree, but a few observations can nonetheless be made.

As a simple proxy for "unwarranted" spread widening, we turn to BBB corporate bond spreads, with the idea of capturing the "warranted" spread widening linked to an overall deterioration of economic conditions and related increase of credit risks (see Figure 1). The metric, however, does have imperfections. Arguably, an unwarranted deterioration of sovereign spreads in the euro area could, via doom-loop mechanisms, also spill over to corporate spreads. A comparison to the US BBB corporate bond spread should largely exclude the effect of a weaker euro area sovereign weighing on its domestic economy and hence also on corporate issuers. The US economy could, however, be at a different point in the economic cycle than the euro area, and thus fail to correctly capture the broader deterioration of credit risk, driving a "warranted" spread widening in the euro area.

At the current juncture, both the US and euro area face a weak economic outlook and monetary policy tightening, and neither of these simple metrics suggest any evidence of "unwarranted" widening of Italian sovereign spreads, i.e. not explained by the overall deterioration of credit.

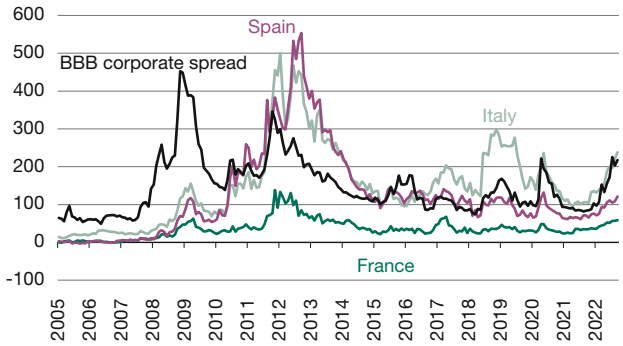
A challenge for the ECB's balance sheet

"Unwarranted" spread widening, however, is not just a challenge for sovereigns but also for the broader lending channels to the real euro area economy. A quick glance at swap spreads shows that these have widened significantly and even to levels above those observed during the euro area debt crisis. The present swap spread widening is more likely a reflection, in particular, of collateral shortages and hedging demand. While unlikely to be the cause of any new debt crisis, the current market frictions, notably in money markets, raise questions on the ECB balance sheet management and may push the ECB to consider new tools.

Figure 1

Euro area: Ten-year sovereign spreads and BBB corporate spreads

Basis points



Source: Refinitiv, SG Economic and Sector Studies.

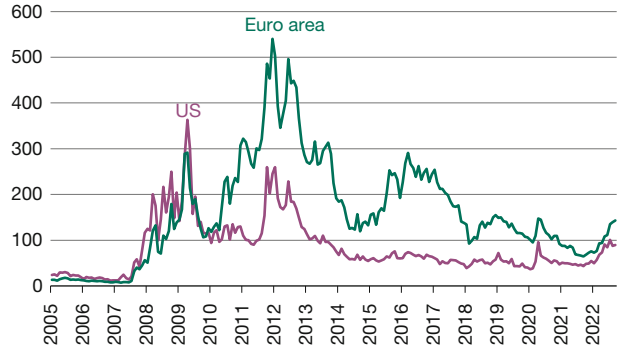
Euro area banks are in far stronger financial shape today, as also reflected in credit default swap (CDS) spreads (Figures 2 and 3). Mirroring the general pricing of credit risks, these have recently widened but remain well below levels observed during the euro area debt crisis. Furthermore, we note that the structural push towards central clearing, where counterparties post collateral, should – all else being equal – help reduce counterparty risk.

A more likely explanation for the present widening of euro area swap spreads, in excess of what has been observed in the US, is linked to various technical factors and structural differences in the respective financial systems. The euro area is notably more dependent on bank lending, and the fragmentated structure of collateral in the euro area is due, not least, to the absence of a single safe asset comparable to US Treasuries.

It is interesting, with this backdrop in mind, to consider the key role that the Eurosystem balance sheet today plays for funding and collateral transformation, and its key role in the toolkit.

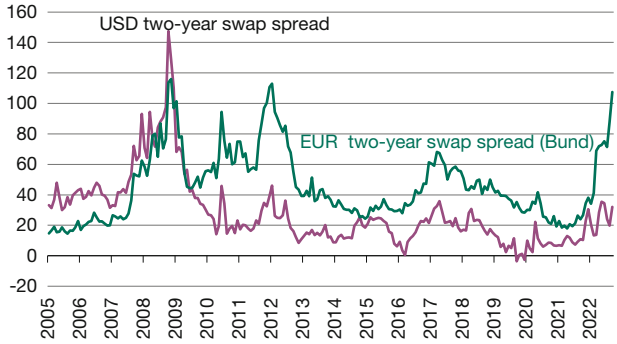
Back in December 2011, the ECB announced the first non-standard LTRO with a maturity of 36 months and the option of early repayment after one year, along with the easing of collateral rules. This formula has since been

Figure 2
Banks five-year credit default swap
Basis points



Source: Refinitiv, SG Economic and Sector Studies.

Figure 3
Two-year swap spreads



Source: Refinitiv, SG Economic and Sector Studies.

used numerous times, with characteristics adopted to the different situations. The tool was also drawn upon in response to the COVID-19 pandemic and LTROs presently stand at €2,215bn out of €8,759bn total assets on the consolidated ECB balance sheet. This compares to securities held for monetary policy purposes of €4,955bn (ECB, 2022a).

A significant chunk of the financing for these operations comes from reserves, which presently stand at €4,803bn. Euro area banks, in turn, hold a sizable amount of the excess reserves[1] as the High-Quality Liquid Assets (HQLA) required to meet financial regulations. To the extent that the ECB accepts non-HQLA collateral, the Eurosystem not only plays a role for longer-term bank funding via the supply of LTROs, but also for collateral transformation (Grandia et al., 2019). This observation on collateral transformation holds true also for the Eurosystem's asset purchases. Excess reserves are available only to banks and not the broader financial system, and Eurosystem asset purchases are regularly blamed for the shortage of supply of the euro area's safest sovereign asset, namely German government issues. This argument should be complemented by the related increase of reserves, the safest assets, albeit only accessible to the banking system.

A related concern is that the ECB will struggle to transmit its monetary policy to the money markets. The latest rate hike did not feed fully through to the euro short-term rate (€STR), the euro benchmark for bank's unsecured overnight borrowing costs, but overall the result was satisfactory. No doubt the ECB's decision of 8 September 2022 to temporarily (until 30 April 2023) remove the 0% interest rate ceiling for remuneration of government deposits at the Eurosystem was helpful in this respect.

A recent ECB working paper (Eisenschmidt et al., 2022) suggested that allowing over-the-counter customers access to inter-dealer repo platforms and/or allowing non-banks access to a secured deposit facility, similar to the Fed's overnight reverse repo agreement, may be an effective way to improve monetary policy transmission. Traditionally, the ECB has stayed away from such measures for fear of disintermediating banks, and not least in a still fragmented system that is heavily dependent on bank lending. A further question if the ECB were to offer such an instrument, is what collateral would it supply for reverse repo operations.

The ECB has announced that it plans to continue asset purchase programme reinvestment for now and PEPP reinvestment at least until the end of 2024. Moreover, the Governing Council has stated that it continues to monitor bank funding conditions, a hint that an extension of LTROs could be announced if deemed necessary.

While the points raised above are reassuring in as much as there is little indication of any systemic financial stress, important questions still loom as to how the ECB will manage its large balance sheet in a period of monetary policy tightening. As noted by ECB Board Member Panetta in his speech on 25 May 2022,

> although we have plenty of experience of how asset purchases and policy rates can reinforce each other as part of an easing strategy, we have no experience of the reverse scenario in the euro area. And the experience of other major central banks, limited as it is, is

1 Reserves in excess of the minimum reserve requirements.

unlikely to be transferable to the euro area given the unique nature of our economic, financial and institutional set-up (Panetta, 2022).

Conditionality is the cornerstone

With the euro area now in full possession of an effective toolkit to stem funding risks as long as conditionality is respected, the willingness to respect that conditionality becomes the cornerstone in preventing a new euro area debt crisis. It is no wonder, in this context, that national political debates are now scrutinised by markets for hints of rhetoric that may challenge the respect of conditionality.

The Eurobarometer is a popular source of information for those seeking to gauge these trends, with the advantage that these indicators have a long history, but with the drawback of being updated only twice a year, leaving markets to make their own assessment, drawing on rhetoric, polling and economic trends to fill the gap.

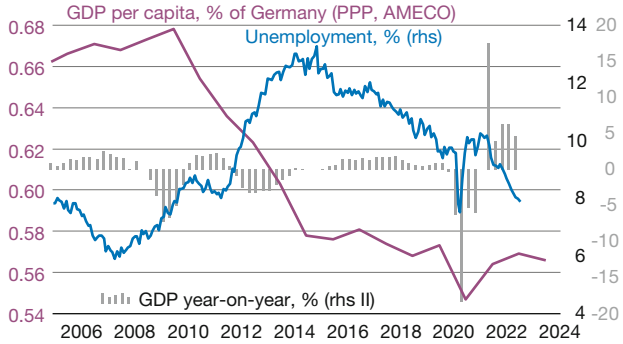
Just zooming in on Italy, the latest Eurobarometer from the summer of 2022 shows support for the single currency at 71%, just below the EU27 average of 72%. Mirroring this positive trend, we also note that many of the political parties previously calling for euro exits are no longer doing so. Overall attitudes towards the EU, however, remain morose with 46% seeing the EU conjuring up a positive image, 38% neutral and 16% negative.

Several studies have sought to understand the drivers behind such trends, and the following list sets out some of the most popular explanations: (1) the overall state of the economy, (2) perceptions of European solidarity in dealing with problems, (3) the perceived risk of the euro being a source of inflation and instability and (4) eurosceptic positions expressed by political leaders. As noted above, this latter factor comes with a certain level of circularity as the rhetoric of politicians may also be influenced by their own perceptions of public opinion.

Just looking at some of the recent trends, and still zooming in on Italy, on growth dynamics, we observe that the decline in Italian GDP per capita relative to that of Germany on a purchasing power parity basis is no longer in freefall. Moreover, setting aside the pandemic related recession in 2020, overall real GDP growth outcomes have also improved, and unemployment rates have declined significantly.

The EU's handling of the pandemic, and not least the introduction of the Next Generation EU facility worth up to €750 billion (in 2018 prices), likely offered further reassurance on European solidarity and thus the merits of the EU. ECB measures were likely a further positive, and not least with the PEPP and LTROs.

Figure 4
Italy: Key economic indicators



Source: Refinitiv, SG Economic and Sector Studies.

On inflation, the recent surge is more likely blamed on Russia and soaring energy costs than on Europe. The question of how the EU tackles the issue of electricity prices and, more broadly, manages solidarity in energy supply over the winter could become a new test for public attitudes towards the EU, and not just in Italy. The ECB, moreover, faces a challenge in tightening monetary policy without triggering a recession, particularly a recession with asymmetrical effects across member states.

Baccaro et al. (2021) further suggested that opposition to austerity in Italy outweighs support for the euro. This research was conducted at a time when conditionality came with an ESM programme and thus with direct external oversight. The conditionality attached to the ECB's new TPI instrument, does not involve the same force of direct oversight but does require that national governments respect the overall EU fiscal framework. Understanding public attitudes towards this type of conditionality will require more work that is probably still premature to conduct, not least given the ongoing review of the EU fiscal framework.

There is little disagreement that the EU's current fiscal framework needs reform to reach better fiscal outcomes and to secure better management of the inevitable trade-offs between limiting fiscal risks and stabilising economic output. Agreeing upon such reform will no doubt be politically challenging but has become all the more important with the new TPI now conditioned on the respect hereof and with the enforcement of the fiscal framework suspended under the so-called "general escape clause" of the Stability and Growth Pact, until the end of 2023.

The Commission has nonetheless called for a prudent approach, favouring investment over current expenditures.

Numerous proposals have been set forth as to how the EU fiscal framework may be improved, and one of the most interesting questions is whether the new framework will contain a permanent central fiscal tool, inspired by the NGEU, and as called for in a recent IMF paper (Arnold et al., 2022). Such a tool could help support the urgently needed investment, not least in developing a new green energy infrastructure. The hope is, moreover, that Germany with its urgent need to revamp its unsustainable economic model, and overly dependent on cheap fossil fuels, may today be more open to such suggestions than in the past. Indeed, the observations made above on public attitudes towards the EU likely also hold true for Germany. It is key for the euro area to secure "positive convergence", i.e. where member states enjoy positive per capita growth and converging overtime to the higher levels across member states.

A further interesting question in respect to the new EU fiscal framework is also the role that the National Energy and Climate Plans (NECPs) may take on. The Commission currently monitors these and reports on progress every two years as part of the State of the Energy Union Reports. The next set of NECPs are due in 2023 and will be key for investor visibility.

Welcome as a permanent NGEU-like feature would be, it is unlikely that it would be large enough to cover the significant investment needs. The EU Commission estimates investments needs of €520 billion per annum out to 2030 (€390 billion for decarbonisation and €130 billion for other environment goals) and a further €125 billion per annum for the digital transition. Further significant investment is also needed for climate adaptation, necessary to deal with the damage already done to the climate system and the increased occurrence of extreme weather.

The European financial system thus needs to be in a position to supply such substantial amounts of new net private financing, and this requires completion of a banking union and a deep capital markets union. It is unlikely, moreover, that a further increase of the ECB balance sheet would be able to fill this gap. Indeed, developing green technologies, ensuring energy security and growing new green businesses will require green capital and not just green bonds and green bank loans. An ECB Working Paper found that CO_2 emissions per capita are lower in economies that are more equity funded (De Haas and Popov, 2019). Europe needs to reduce its debt-equity bias.

The winning paper of the ECB's 2022 Young Economist Prize states:

> Using a macro model consistent with micro data on European firms' external financing over their lifetime, I find that financial frictions lead to big output losses, due mainly to young firms' early exits. Middle-income countries see 60% higher losses than high-income countries (Kochen, 2022).

This further illustrates the need for the right type of funding to grow new green businesses.

The ECB, for its part, can support green EU policies with its new framework for the greening of monetary policy. For now, the focus in terms of monetary policy instruments is on introducing climate criteria on private asset purchases and private collateral provided, but it does raise an interesting question as to whether such criteria should also be introduced on public paper, adding a new dimension to the ECB conditionality.

For European policymakers preparing and deciding on these new designs, keeping in mind what drives public attitudes to conditionality is key. Designs that ensure positive convergence and good solidarity will keep future crises at bay. Albeit at times challenging and rarely linear in progress, this is the essence that underpins the long history of European integration.

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DOI: 10.1007/s10272-022-1074-1

Intereconomics, 2022, 57(5), 294-305

JEL: F1, F51

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The Economic Effects of Potential EU Tariff Sanctions on Russia – A Sectoral Approach

As part of its sanctions regime, the United States recently announced the imposition of punitive import tariffs on 570 product groups from Russia. The European Union may follow suit and enact sanctions on Russia that mirror the US sanctions in scale and scope. Using a sector-specific partial-equilibrium model, we quantify the impact of such mirror sanctions. We find they would inflict on Russia welfare losses of at least $996 million per year – at an overall cost of $150 million to EU consumers. Breaking down these totals in a sectoral analysis, we find that mirroring the US action would produce mixed results from the EU's perspective. On the one hand, tariff sanctions cover a number of sectors whose inclusion would inflict particularly large welfare losses for Russia and/or high welfare gains for the EU. On the other hand, mirror sanctions would bring significant inefficiencies for the EU. For example, in 72 sectors, higher tariffs would inflict greater harm on the EU than on the Russian economy, causing EU losses in excess of $560 million. Thus, consistent with the spirit of international coordination and alignment, the EU may consider adjusting the suite of tariff sanctions rather than simply adopting the US package.

At the 2022 G7 Summit in Germany, leaders agreed to "coordinate" and "align" actions involving extra tariff measures on imports from Russia in response to Russia's invasion of Ukraine. G7 members pledged to "continue our targeted use of coordinated sanctions for as long as necessary, acting in unison at every stage" (G7 Research Group, 2022a).[1] During the G7 Summit, the United States announced plans to significantly increase tariff rates on hundreds of Russian products (White House, 2022). Effective 27 July 2022, Presidential Proclamation 10420 raised applicable tariffs on 570 product groups[2] imported from Russia to 35% *ad valorem* (Federal Register, 2022). Given the stated intention of "alignment", "acting in unison at every stage" and "unprecedented coordinated sanction measures" pervading the G7 Summit (G7 2022a; 2022b), it appears likely that other countries will follow the United States' lead and soon impose steep tariff increases on Russian import products.

This paper engages in a thought experiment. We examine the effects of the European Union, as one of the United States' closest allies on Russia sanctions, aligning itself with the United States not just by enacting similar tariff measures, but by imposing "mirror" sanctions, i.e. applying the same 35% *ad valorem* tariff on the same 570 prod-

Open Access funding provided by ZBW – Leibniz Information Centre for Economics.

* All opinions expressed in this paper are the authors' and reflect neither the views of their employers nor the clients they represent. The authors would like to thank Anson Soderbery for guidance and support.

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1 This proposed action by G7 is the latest in a growing list of economic sanctions imposed on Russia by a coalition of over 40 countries in response to its aggressive war on Ukraine. For an up-to-date overview of Russia-related sanctions, see, e.g. the resources maintained by Sidley Austin LLP (n.d.).

2 In this paper, we use the terms "product group" and "sector" interchangeably.

uct groups.[3] Using a sector-by-sector partial-equilibrium framework, we quantify the economic effects that such mirror sanctions would have on the Russian economy, as well as on the EU economy itself.[4] We then assess the sanctions list at the product level and evaluate the consequences of including certain sectors in the EU mirror sanctions package. This paper is purely descriptive in that we analyse tariff increases on the same 570 product groups initially selected by the United States. Our results should not be read as recommendations on adding or dropping certain product groups, or as suggestions for designing an alternative EU retaliation package, which always involves additional, non-economic considerations.[5]

Methodology of the model and its application to potential mirror sanctions by the EU

We apply a proprietary model and software designed by the Economic Analysis Unit of Sidley Austin LLP.[6] The tool consists of a series of bilateral partial-equilibrium models between (groups of) exporters and (groups of) importers. The model is based on a standard Armington-type framework of international trade in which products are differentiated by source country, and consumers view products from different countries as imperfect substitutes. The model also considers exporter and importer market power (the "large-country" assumption), thus enabling us to quantify potential terms-of-trade gains for the sanctioning country.

For each product group included in the latest US tariff sanction package (and therefore in the hypothesised EU mirror sanctions), a system of equations can be solved with information on (i) pre-sanction trade data, (ii) the size of the extra tariff shock (in percentage points) and (iii) the relevant elasticities. The model is implemented by using 2021 trade flow data from the World Bank's World Integrated Trade Solution System as the pre-sanction baseline.[7] As usual for this class of models, the quality of the results is critically determined by the quality of the elasticity estimates. We use elasticity estimates for import demand and export supply compiled by Soderbery (2018), which are particularly comprehensive and also available for specific country pairs. Since Soderbery (2018) does not provide for elasticity estimates for the EU as a bloc, we apply estimates for Germany (as the largest EU economy and Russia's largest European trading partner). This implies that economic effects on Russia reported in this paper are likely underestimated, while welfare losses (gains) to the EU are likely overestimated (underestimated).[8]

The following economic metrics are of particular interest to our analysis:

Trade affected: This metric describes the pre-sanction trade value that is impacted by the tariff increase. This metric is not an expression of economic effects per se, but it can be seen as an approximate measure of the economic relevance that a certain product group has both for the EU and for Russia.

Blocked trade/decoupling: This metric captures the import value (as a percentage of pre-sanction imports) that is interrupted as a result of the tariff increases. While it is not an expression of welfare effects, it is a useful metric to express the level of economic decoupling between the EU and Russia that occurs in a given product group as a result of the new tariff sanctions.

Terms-of-trade gains: Whenever the importer (EU) has a sufficient degree of market power vis-à-vis an exporter, the exporter (Russia) must absorb part of the tariff incidence by lowering its prices. Such lowering of export prices ("pass-through") improves the importing country's terms of trade (i.e. the relative price at which the countries exchange goods and services) to the same degree that it worsens the exporting country's terms of trade. Multiplied with post-sanction import values, Russia's terms-of-trade losses measure the reduced export value of those Russian sales that still occur after the tariff increase has gone into effect. Compared to the pre-sanction situation, export

3 We do not opine on the probability of the EU enacting import sanctions that exactly mirror in scale and scope those imposed by the United States. We take note of the above-quoted pledges to act "in unison at every stage" by the seven most powerful democracies (G7 Research Group, 2022a), but are not aware of any official statement as to what such coordination among the G7 and with other allies would look like in practice. In that sense, our assumption of the EU imposing mirror sanctions is one of many policy scenarios.

4 This paper does not engage in an analysis of the effects of the new US tariff sanctions on the US and Russian economies. The interested reader is referred to a previous paper by the authors on that issue (Latipov et al., 2022).

5 Our assessment is guided purely by economic considerations. We appreciate that the issue of sanction design may equally be driven by political exigencies and opportunities. However, a discussion of political rationales is beyond the scope of this article.

6 Further details about the model, its methodology and data sources used are available in Latipov et al. (2022).

7 Our model treats the EU as one trade bloc. We appreciate that economic integration with Russia differs significantly between the individual EU members. Analyses on the country level are available, but not presented here.

8 The EU as an economic bloc is more powerful than Germany is on its own. Moreover, depending on the specific tariff lines, certain EU members may have more importer power than Germany. Consequently, EU members collectively constitute a larger and more powerful export region (from Russia's perspective). Hence, Russian export supply elasticities vis-à-vis all EU members are likely steeper, and EU import demand elasticities vis-à-vis Russia flatter than Germany's alone. Higher welfare losses to Russia, and higher welfare gains to the EU are then a likely consequence.

Table 1
Total economic effects of tariff sanctions on Russia, the European Union and the United States

Ally imposing sanctions	(1) Trade affected (ally's imports from Russia) (US $1000)	(2) Blocked trade/Decoupling (% of pre-sanction imports of affected product groups, weighted average)	(3) Terms-of-trade gain to ally (US $1000)	(4) Tariff revenue (based on 35% tariff, US $1000)	(5) Welfare effect on ally (US $1000)	(6) Welfare loss for Russia (US $1000)
EU	10,842,398	63	596,521	883,420	-150,111	-995,976
US	2,677,683	62	97,632	205,066	-97,701	-184,901
Total EU and US	13,520,081		694,153	1,088,486	-247,812	-1,180,877

Source: Authors' own calculation.

sales occur at a lower price. These "income effects" represent a pure net wealth transfer from Russia to the EU.

Tariff revenue: Tariff revenue is the tariff rate times the import value that still enters the ally's market after the sanction has been imposed.[9] One part of tariff revenues constitutes the share of tariff revenue paid by Russian exporters on account of its terms-of-trade losses (see previous paragraph), while another is a domestic net wealth transfer between consumers and the government of the sanctioning country.

Total welfare effect to the EU: Importer welfare effects are quantified as the difference between the potential terms-of-trade gains (described above) and efficiency losses suffered by the importing economy from inefficiently small import volumes. Total welfare effects to the EU can be positive or negative, depending on the market power of the EU for the specific import good, the importance of the good to the EU economy, and the size of the tariff hike.

Total welfare losses to Russia: Russia as the exporting country is certain to lose from higher EU import tariffs. Economic harm to Russia is calculated as the sum of terms-of-trade losses (described above) and efficiency losses stemming from inefficiently low export volumes and the unfavorable resource reallocation within the Russian economy that ensues.

Our model is operationalised on the sectoral level, either on the 4- or 6-digit aggregation level of the Harmonized System (HS). The US tariff increases (and thus the EU mirror sanctions) are, however, defined for 570 sectors at the HS 8-digit level. This requires us to aggregate the US target list to the HS 6-digit level. The aggregation reduces the number of distinguishable sectors from 570 to 393 individual product groups. The inevitable reduction in granularity likely makes our model over inclusive of reported trade flows, because the model may include product groups that would not be actually subject to the EU mirror sanctions on the HS 8-digit level, but are swept into a particular product group on the HS 6-digit level. Moreover, we lack reliable elasticity estimates for 83 further sectors and so are able to apply the model (i.e. quantify welfare results) to a total of 310 individual product groups.[10] Due to these missing observations (and despite the over-inclusiveness that results from the aggregation of target sectors to the HS 6-digit level mentioned above), the economic effects we report throughout will most likely underestimate the overall economic impacts of the new EU sanctions, discussed below.

Results

Table 1 summarises the aggregate economic effects that would result from the application of the described tariff increases on hundreds of product groups. In total, EU mirror tariffs would affect trade worth $10.8 billion per year (column (1)), which represents roughly 6.1% of all 2021 EU imports from Russia (or 20.4% of all non-energy imports). We estimate that these tariffs would reduce trade in affected sectors by 63% (column (2)). Moreover, they would cause annual terms-of-trade losses of $596 million and welfare losses of $996 million to Russia (columns (3) and (6), respectively). At the same time, they would cost EU consumers $150 million (column (5)), and generate tariff revenue amounting to $883 million per year (column (4)).

The second row of Table 1 summarises the economic effects of the original US tariff sanctions on the US and Russian economies. Overall, US tariff increases are estimated to affect trade worth $2.68 billion per year, and reduce trade in the affected sectors by 62%. Furthermore, across

9 Note that this metric measures total tariff revenues collected by the EU after the imposition of its new tariff sanctions. This is different from additional, or extra tariff revenues, a figure that results from subtracting pre-sanction tariff revenues from those collected after the new sanctions are imposed.

10 The 83 "missing" product groups together accounted for pre-sanction (2021) imports from Russia worth $666 million (or roughly 6% of all targeted imports).

Table 2
Top ten economically significant sectors and their effects

HS 6-digit code	Description (abbreviated)	(1) Trade affected (US $1000)	(2) Pass-through to EU consum-ers (%)	(3) Blocked trade (%)	(4) Tariff revenue (US $1000)	(5) Terms-of-trade gains to EU (US $1000)	(6) Welfare effect on EU (US $1000)	(7) Welfare effect on EU (%)	(8) Welfare loss for Russia (US $1000)	(9) Welfare loss for Russia (%)
720712	Semi-finished products of iron or non-alloy steel	3,092,181	71	100	0	0	-385,624	-12	-155,507	5
440712	Fir (Abies spp.) and spruce (Picea spp.)	845,467	33	32	153,482	133,573	117,647	14	-165,487	20
390210	Polypropylene, in primary forms	633,094	36	37	93,126	72,991	61,043	10	-94,295	15
401110	New pneumatic tyres, of rubber, of a kind used for motor cars	523,019	47	37	84,299	52,892	38,907	7	-68,452	13
440719	Coniferous wood	384,160	33	32	69,739	60,693	53,456	14	-75,193	20
440131	Wood pellets	297,461	72	74	24,497	7,585	-20,144	-7	-18,336	6
760612	Plates, sheets and strip, of aluminium alloys	273,314	55	43	37,870	19,418	10,622	4	-26,598	10
440711	Pine (Pinus spp.)	262,338	33	32	47,624	41,446	36,504	14	-51,349	20
400219	Styrene-butadiene rubber	216,592	80	98	1,186	258	-29,477	-14	-7,789	4
400220	Butadiene rubber BR	216,528	80	98	1,186	258	-29,468	-14	-7,786	4
Subtotal (top ten product groups)		6,744,154			513,007		-146,534		-670,792	
Total (all 570 product groups)		10,842,398			883,420		-150,111		-995,976	
Share (%)		62			58		98		67	

Note: The list contains top ten product groups in terms of trade affected.

Source: Authors' own calculation.

the universe of target sectors, new US sanctions will inflict Russian welfare losses amounting to $185 million per year and cause welfare losses to the United States' own economy of $98 million.

Comparing the economic impact generated by (actual) US versus (hypothetical) EU sanctions, we note that mirror sanctions by the EU would have more "bite", on account of the much larger trade relationship between Russia and the EU. Affected trade and welfare losses to Russia are nearly four times those of the US sanctions. The "cost share" of sanctions – the ratio of self-harm (column (5)) to harm on Russia (column (6)) – is nearly 53% for the United States, while it is only 15% for the EU.[11] In other words, the United States pays a significantly higher price, in relative terms, for its sanctions than the EU would pay.

The last row of Table 1 summarises the economic effects reported for the EU and the United States. Concerted action by the United States and the EU would inflict welfare losses to Russia of at least $1.18 billion. Estimates for combined harm on Russia must be seen as the lower end of the actual effects. First, the effects reported in Table 1 are estimated for individual, not joint, action by the United States and the EU, respectively. If both allies were to combine forces and become one large export region (from Russia's perspective), they would exercise even higher purchasing power vis-à-vis Russian exports.[12] However, in the current model we have not modified supply and demand elasticity estimates that would reflect such joint market power. Second, as mentioned, we are unable to report effects for all 393 product groups on account of missing elasticity data. Evidently, results for any additional sector would only increase Russian welfare losses.[13]

Given that potential mirror sanctions by the EU would significantly boost the efficiency of US action, one might expect the United States to have a keen interest in convincing the EU to join it in imposing sanctions. But would following suit by imposing mirror sanctions also be in the EU's best interest? This question cannot be answered merely by looking at the aggregate effects presented in Table 1. Totals can mask important dynamics that occur

11 Mathematically, the cost share is strictly positive and only works for situations in which both Russia and the sanctioning country incur negative wealth effects. The closer the cost share is to zero percent, the more preferable for the sanctioning ally.

12 For an explanation of underlying economic mechanisms, see footnote 8.

13 See footnote 10.

Table 3
Sectors with high absolute welfare losses to Russia

HS 6-digit code	Description (abbreviated)	(1) Trade affected (US $1000)	(2) Pass-through to EU con-sumers (%)	(3) Blocked trade (%)	(4) Tariff revenue (US $1000)	(5) Terms-of-trade gains to EU (US $1000)	(6) Welfare effect on EU (US $1000)	(7) Welfare effect on EU (%)	(8) Welfare loss for Russia (US $1000)	(9) Welfare loss for Russia (%)
440712	Fir (Abies spp.) and spruce (Picea spp.)	845,467	33	32	153,482	133,573	117,647	14	-165,487	20
720712	Semi-finished products of iron or non-alloy steel	3,092,181	71	100	0	0	-385,624	-12	-155,507	5
390210	Polypropylene, in primary forms	633,094	36	37	93,126	72,991	61,043	10	-94,295	15
440719	Coniferous wood	384,160	33	32	69,739	60,693	53,456	14	-75,193	20
401110	New pneumatic tyres, of rubber, of a kind used for motor cars	523,019	47	37	84,299	52,892	38,907	7	-68,452	13
440711	Pine (Pinus spp.)	262,338	33	32	47,624	41,446	36,504	14	-51,349	20
760612	Plates, sheets and strip, of aluminium alloys	273,314	55	43	37,870	19,418	10,622	4	-26,598	10
401120	New pneumatic tyres, of rubber, of a kind used for buses	163,556	47	37	26,362	16,540	12,167	7	-21,406	13
440910	Coniferous wood, incl. strips and friezes for parquet flooring	134,489	40	66	12,650	9,686	3,540	3	-19,055	14
440131	Wood pellets	297,461	72	74	24,497	7,585	-20,144	-7	-18,336	6
720421	Waste and scrap of stainless steel (excluding radioactive)	154,115	55	55	20,591	11,044	2,959	2	-17,701	11
760429	Bars, rods and solid profiles, of aluminium alloys	153,769	50	42	20,998	12,307	7,873	5	-16,825	11
392020	Plates, sheets, film, foil and strip, of non-cellular polymers of ethylene	91,693	33	40	12,704	10,464	8,725	10	-13,948	15
442199	Articles of wood	98,374	49	56	12,204	7,561	3,076	3	-12,276	12
291612	Esters of acrylic acid	133,953	61	44	19,063	8,291	3,157	2	-11,533	9
Subtotal (selected product groups)		7,240,983			635,207	464,493	-46,091		-767,962	

Note: The list contains product groups for which EU mirror tariff increases result in Russian welfare losses in excess of $10 million.

Source: Authors' own calculation.

at the sectoral level. Below, we therefore present several observations resulting from our product-level analysis that can shed light on whether, and to what degree, the EU may wish to sign on to the United States' selected sanctions package.

Comment 1: Top ten target sectors generate nearly two-thirds of total economic effects

As a matter of first impression, we note that despite the fact that the sanctions package selected by the United States covers 570 product groups (which we model as 393 HS 6-digit line items), only a handful of targeted product groups generate the bulk of economic effects. Table 2 lists the top ten product groups in terms of "trade affected" by EU mirror sanctions. These ten sectors collectively would cover 62%, or $6.7 billion, of all affected EU imports (column (1)), cause $670 million, or 67%, of total Russian welfare losses (column (8)), and generate self-harm to the EU of $147 million, or 98% of total damages (column (6)).[14] The flipside of this observation then is that the remaining product groups together cover considerably fewer imports from Russia and generate smaller total effects than the ten sectors listed in Table 2.

Comment 2: Certain target sectors inflict particularly high welfare losses on Russia

The EU mirror sanction package contains various product groups, the inclusion of which causes particularly large welfare losses to Russia. Table 3 lists all those product groups for which EU mirror sanctions would inflict Rus-

14 The high figure of 98% of total EU welfare losses can be explained by the fact that mirror tariffs on several other sectors induce welfare gains for the EU economy. See Comment 3.

Table 4
Sectors with high relative welfare losses to Russia

HS 6-digit code	Description (abbreviated)	(1) Trade affected (US $1000)	(2) Pass-through to EU con-sumers (%)	(3) Blocked trade (%)	(4) Tariff revenue (US $1000)	(5) Terms-of-trade gains to EU (US $1000)	(6) Welfare effect on EU (US $1000)	(7) Welfare effect on EU (%)	(8) Welfare loss for Russia (US $1000)	(9) Welfare loss for Russia (%)
846229	Bending, folding, straightening or flattening machines	659	0	0	146	219	219	33	-219	33
840690	Parts of steam and other vapour turbines	1,738	0	0	380	557	557	32	-558	32
491110	Trade advertising material, com-mercial catalogues and the like	373	19	14	81	91	89	24	-98	26
491191	Pictures, prints and photographs	619	19	14	134	151	148	24	-163	26
381519	Supported catalysts	1,556	14	9	328	388	386	25	-407	26
871680	Vehicles pushed or drawn by hand	2,108	22	20	417	440	425	20	-494	23
844391	Parts and accessories of printing machinery	370	25	39	59	60	54	15	-79	21
490191	Dictionaries and encyclopaedias, and serial instalments thereof	194	24	41	29	31	27	14	-41	21
490110	Printed books, brochures and similar printed matter, in single sheets	735	24	41	111	116	103	14	-156	21
490199	Printed books, brochures and similar printed matter (excluding those in single sheets)	14,361	24	41	2,164	2,259	2,015	14	-3,051	21
846693	Parts and accessories for ma-chine tools for working metal	2,081	25	42	309	309	272	13	-419	20
950510	Christmas articles	495	33	24	98	85	78	16	-98	20
870110	Pedestrian-controlled agricultural tractors	755	29	27	136	126	116	15	-149	20
440711	Pine (Pinus spp.)	262,338	33	32	47,624	41,446	36,504	14	-51,349	20
440791	Oak (Quercus spp.)	15,088	33	32	2,739	2,384	2,099	14	-2,953	20
440712	Fir (Abies spp.) and spruce (Picea spp.)	845,467	33	32	153,482	133,573	117,647	14	-165,487	20
440719	Coniferous wood	384,160	33	32	69,739	60,693	53,456	14	-75,193	20
Subtotal (selected product groups)		1,533,097			277,975	242,928	214,197		-300,915	

Note: The list contains product groups for which EU mirror sanctions result in Russian welfare losses in excess of 20% of pre-sanction imports.

Source: Authors' own calculation.

sian welfare losses in excess of $10 million.[15] These sectors together affect $7.2 billion in 2021 trade (column (1)) and cause losses of $768 million to the Russian economy (column (8)).[16] At the same time, mirror tariffs on these products cost the EU economy $46 million (column (6)). This results in a highly favorable EU cost share of 6%.

Table 4 contains all product groups for which EU mirror tariffs cause high *relative* welfare losses to the Russian economy, which we define as losses in excess of 20% of pre-sanction imports to the EU. While nearly half of the product groups listed in Table 4 concern small import volumes of less than $1 million (column (1)), total Russian welfare losses for these products amount to a sizable total of $301 million (column (8)). Including these sectors even yields total welfare gains for the EU of $214 million (see column (6)).

Comment 3: Certain target sectors generate positive welfare effects for the EU

Indeed, the EU mirror sanction package includes numerous sectors for which tariff increases result in substantial welfare

15 This threshold of $10 million in Russian welfare losses is somewhat arbitrary, as are other thresholds introduced below. Their selection is mainly driven by our intention to keep the number of rows in the tables manageable. A Data Appendix, which is available from the authors upon request, contains a full set of sectors and economic effects.

16 Note that this list contains some product groups whose inclusion may be seen as problematic (see Comments 4 to 7). Note also that there is significant overlap between this list and that in Table 5 (sectors in which the EU generated particularly high welfare gains).

Table 5
Sectors with high absolute welfare gains for the EU

HS 6-digit code	Description (abbreviated)	(1) Trade affected (US $1000)	(2) Pass-through to EU con-sumers (%)	(3) Blocked trade (%)	(4) Tariff revenue (US $1000)	(5) Terms-of-trade gains to EU (US $1000)	(6) Welfare effect on EU (US $1000)	(7) Welfare effect on EU (%)	(8) Welfare loss for Russia (US $1000)	(9) Welfare loss for Russia (%)
440712	Fir (Abies spp.) and spruce (Picea spp.)	845,467	33	32	153,482	133,573	117,647	14	-165,487	20
390210	Polypropylene, in primary forms	633,094	36	37	93,126	72,991	61,043	10	-94,295	15
440719	Coniferous wood	384,160	33	32	69,739	60,693	53,456	14	-75,193	20
401110	New pneumatic tyres, of rubber, of a kind used for motor cars	523,019	47	37	84,299	52,892	38,907	7	-68,452	13
440711	Pine (Pinus spp.)	262,338	33	32	47,624	41,446	36,504	14	-51,349	20
401120	New pneumatic tyres, of rubber, of a kind used for buses	163,556	47	37	26,362	16,540	12,167	7	-21,406	13
760612	Plates, sheets and strip, of aluminium alloys	273,314	55	43	37,870	19,418	10,622	4	-26,598	10
392020	Plates, sheets, film, foil and strip, of non-cellular polymers of ethylene	91,693	33	40	12,704	10,464	8,725	10	-13,948	15
760429	Bars, rods and solid profiles, of aluminium alloys	153,769	50	42	20,998	12,307	7,873	5	-16,825	11
440796	Birch (Betula spp.)	45,490	33	32	8,214	7,099	6,281	14	-8,739	19
440890	Sheets for veneering	35,673	35	29	6,429	5,241	4,643	13	-6,329	18
854430	Ignition wiring sets and other wiring sets for vehicles, aircraft or ships	36,773	34	31	6,329	5,220	4,609	13	-6,382	17
Subtotal (selected product groups)		3,448,346			567,174	437,884	362,478		-555,003	

Note: The list contains top ten product groups in terms of welfare gains for the EU.

Source: Authors' own calculation.

gains to the EU economy. Welfare gains to the EU economy emerge in those sectors in which (i) the EU enjoys market power vis-à-vis Russia (reflected by low levels of pass-through; column (2)), and (ii) pre-sanction most-favoured-nation tariffs that were set at inefficiently low levels as far as Russian imports are concerned. Tariff increases are then economically beneficial, because the EU can shift much of the economic costs of tariff increases on Russian exporters via terms-of-trade effects.[17] Table 5 lists the top ten product groups for which EU mirror sanctions result in economic gains (column (6)). These product lines affect imports worth $3.45 billion and generate welfare gains to the EU economy of $362 million, as well as Russian welfare losses of roughly $555 million.

Comment 4: Mirror sanctions would result in blocked trade for 19 sectors

Another interesting feature of the EU mirror sanctions is that the application of a 35% tariff would lead to a complete interruption of import activity from Russia ("blocked trade") in a number of sectors (Table 6, column (3)). The 19 relevant product groups together affect an amount of $3.16 billion in EU imports (column (1)). Notable on this list of sectors is one product group (HS 720712 Semi-finished products of iron or non-alloy steel) for which imposition of EU mirror sanctions would cut off imports worth $3.09 billion.

If achieving a decoupling of the EU economy from Russian imports were one of the policy objectives pursued by EU policymakers (possibly with the aim of reducing dependency from Russian sources), then the inclusion of these 19 sectors could make sense. However, as Table 6 illustrates, such decoupling comes at a steep economic cost to the EU, resulting in significant absolute welfare losses of $397 million (column (6)). At the same time, decoupling also generates relatively high welfare losses (i.e. relative to those in Russia; columns (8) and (9) of Table 6). Full decoupling often results from perfectly elastic (horizontal) Russian export supply curves facing the EU. A horizontal supply curve in a given sector implies that the EU is a "small" import market with no mar-

17 This, of course, is the application of the "optimal tariff" theory first espoused by Johnson (1953).

Table 6
Sectors in which EU sanctions result in blocked trade

HS 6-digit code	Description (abbreviated)	(1) Trade affected (US $1000)	(2) Pass-through to EU con-sumers (%)	(3) Blocked trade (%)	(4) Tariff revenue (US $1000)	(5) Terms-of-trade gains to EU (US $1000)	(6) Welfare effect on EU (US $1000)	(7) Welfare effect on EU (%)	(8) Welfare loss for Russia (US $1000)	(9) Welfare loss for Russia (%)
720712	Semi-finished products of iron or non-alloy steel	3,092,181	71	100	0	0	-385,624	-12	-155,507	5
680610	Slag-wool, rock-wool and similar mineral wools	27,182	100	100	0	0	-4,757	-17	0	0
890399	Outboard motorboats, for pleas-ure or sports	13,332	100	100	0	0	-2,200	-16	0	0
731029	Tanks, casks, drums, cans, boxes	9,790	100	100	0	0	-1,581	-16	0	0
680620	Exfoliated vermiculite, expanded clays, and similar expanded mineral materials	4,999	100	100	0	0	-875	-17	0	0
681099	Articles of cement, concrete or artificial stone	4,494	100	100	0	0	-748	-17	0	0
930630	Cartridges for smooth-barrelled shotguns, revolvers and pistols	2,613	100	100	0	0	-426	-16	0	0
392490	Household articles and toilet articles, of plastics	2,228	100	100	0	0	-317	-14	0	0
731010	Tanks, casks, drums, cans, boxes and similar containers, of iron or steel	1,940	100	100	0	0	-313	-16	0	0
480610	Vegetable parchment	1,834	100	100	0	0	-321	-17	0	0
430219	Tanned or dressed furskins	551	100	100	0	0	-93	-17	0	0
400811	Plates, sheets and strip of cellular rubber	275	100	100	0	0	-44	-16	0	0
293299	Heterocyclic compounds with oxygen hetero-atom[s] only	237	65	100	0	0	-22	-9	-12	5
870310	Vehicles for the transport of persons on snow; golf cars	209	75	100	0	0	-22	-10	-7	3
293219	Heterocyclic compounds with oxygen hetero-atom[s] only	95	65	100	0	0	-9	-9	-5	5
680221	Marble, travertine and alabaster articles thereof, simply cut	25	100	100	0	0	-4	-17	0	0
680291	Marble, travertine and alabaster, in any form (excluding tiles)	20	100	100	0	0	-3	-17	0	0
930621	Cartridges for smooth-barrelled shotguns	11	100	100	0	0	-2	-16	0	0
870600	Chassis fitted with engines, for tractors, motor vehicles	9	7	100	0	0	0	-1	-1	12
Subtotal (selected product groups)		3,162,025			-	-	-397,361		-155,532	

Note: The list contains product groups for which EU mirror sanctions result in full decoupling (100% blocked trade).

Source: Authors' own calculation.

ket power. This enables Russian exporters to fully pass on the EU tariff increase to EU consumers (see "100%" entries in column (2) of Table 6), or to export their goods elsewhere. Russian exporters experience no efficiency losses. EU consumers, on the other hand, are priced out of the market, thus resulting in zero post-sanction imports (and thus zero tariff revenues for EU members), coupled with significant efficiency losses to EU consumers. This results in a highly unfavorable EU cost share of 255% across the 19 sectors at issue.

Comment 5: Targeting economically insignificant sectors produces negligible results

As mentioned in Comment 1, the hypothetical EU mirror sanctions contain hundreds of product groups for which

Table 7
Sectors in which balance of harm to Russia and self-harm to the EU is unfavorable

HS 6-digit code	Description (abbreviated)	(1) Trade affected (US $1000)	(2) Pass-through to EU con-sumers (%)	(3) Blocked trade (%)	(4) Tariff revenue (US $1000)	(5) Terms-of-trade gains to EU (US $1000)	(6) Welfare effect on EU (US $1000)	(7) Welfare effect on EU (%)	(8) Welfare loss for Russia (US $1000)	(9) Welfare loss for Russia (%)	(10) Differ-ence EU-loss to Russia-loss
720712	Semi-finished products of iron or non-alloy steel	3,092,181	71	100	0	0	-385,624	-12	-155,507	5	-230,117
400219	Styrene-butadiene rubber	216,592	80	98	1,186	258	-29,477	-14	-7,789	4	-21,688
400220	Butadiene rubber	216,528	80	98	1,186	258	-29,468	-14	-7,786	4	-21,682
400239	Halo-isobutene-isoprene rubber CIIR or BIIR	170,170	80	98	932	203	-23,159	-14	-6,119	4	-17,040
680610	Slag-wool, rock-wool and similar mineral wools	27,182	100	100	0	0	-4,757	-17	0	0	-4,757
870829	Parts and accessories of bodies for tractors, motor vehicles	32,612	100	86	1,450	0	-4,363	-13	0	0	-4,363
841221	Hydraulic power engines and motors, linear acting cylinders	24,424	100	97	226	0	-3,832	-16	0	0	-3,832
760511	Wire of non-alloy aluminium	182,993	81	65	16,550	3,331	-9,965	-5	-6,463	4	-3,502
400259	Acrylonitrile-butadiene rubber	31,778	80	98	174	38	-4,325	-14	-1,143	4	-3,182
441899	Builders' joinery and car-pentry, of wood	70,172	69	92	1,690	585	-7,249	-10	-4,084	6	-3,165
870323	Motor cars and other motor vehicles principally designed for the transport of persons	50,808	75	94	686	179	-4,337	-9	-1,649	3	-2,689
901420	Instruments and appli-ances for aeronautical or space navigation	55,639	77	80	3,602	902	-5,086	-9	-2,691	5	-2,395
701090	Carboys, bottles, flasks, jars, pots, phials	87,578	84	62	9,373	1,599	-5,279	-6	-2,931	3	-2,348
870899	Parts and accessories, for tractors, motor vehicles	16,494	100	86	721	0	-2,221	-13	0	0	-2,221
890399	Outboard motorboats, for pleasure or sports	13,332	100	100	0	0	-2,200	-16	0	0	-2,200
400231	Isobutylene isoprene rubber	21,950	80	98	120	26	-2,987	-14	-789	4	-2,198
780110	Unwrought lead, refined	29,710	82	80	1,817	337	-2,850	-10	-1,014	3	-1,836
440131	Wood pellets	297,461	72	74	24,497	7,585	-20,144	-7	-18,336	6	-1,809
731029	Tanks, casks, drums, cans, boxes	9,790	100	100	0	0	-1,581	-16	0	0	-1,581
870870	Road wheels and parts and accessories thereof, for tractors, motor vehicles	9,379	100	86	417	0	-1,255	-13	0	0	-1,255
Subtotal (selected product groups)		4,656,773			64,626	15,300	-550,159		-216,302		-333,857

Note: The list contains product groups for which EU mirror sanctions result in excess welfare losses of more than $1 million.

Source: Authors' own calculation.

importation from Russia may be less significant to the EU economy. Indeed, of the 393 sectors that our model can distinguish, 116 feature pre-sanction imports from Russia into the EU of less than $500,000. In relative terms, for 268 product groups, Russian imports account for less than 3% of total EU imports.

There certainly may be valid reasons for including sectors for which Russia is a minor import source. A key motivation for including dozens of product groups that are economically insignificant to the EU is most likely that, while Russia's share in EU imports is negligible, the EU still constitutes an important destination for Russian ex-

Table 8
Sectors with zero or negligible harm to Russia

HS 6-digit code	Description (abbreviated)	(1) Trade affected (US $1000)	(2) Pass-through to EU con-sumers (%)	(3) Blocked trade (%)	(4) Tariff revenue (US $1000)	(5) Terms-of-trade gains to EU (US $1000)	(6) Welfare effect on EU (US $1000)	(7) Welfare effect on EU (%)	(8) Welfare loss for Russia (US $1000)	(9) Welfare loss for Russia (%)
870829	Parts and accessories of bodies for tractors, motor vehicles	32,612	100	86	1,450	0	-4,363	-13	0	0
680610	Slag-wool, rock-wool and similar mineral wools	27,182	100	100	0	0	-4,757	-17	0	0
841221	Hydraulic power engines and motors, linear acting cylinders	24,424	100	97	226	0	-3,832	-16	0	0
870899	Parts and accessories, for tractors, motor vehicles	16,494	100	86	721	0	-2,221	-13	0	0
890399	Outboard motorboats, for pleasure or sports	13,332	100	100	0	0	-2,200	-16	0	0
731029	Tanks, casks, drums, cans, boxes	9,790	100	100	0	0	-1,581	-16	0	0
870870	Road wheels and parts and accessories thereof, for tractors, motor vehicles	9,379	100	86	417	0	-1,255	-13	0	0
870830	Brakes and servo-brakes and their parts, for tractors, motor vehicles	7,005	100	85	321	0	-925	-13	0	0
281129	Inorganic oxygen compounds of non-metals	5,387	100	91	148	0	-732	-14	0	0
680620	Exfoliated vermiculite, expanded clays and similar expanded mineral materials	4,999	100	100	0	0	-875	-17	0	0
681099	Articles of cement, concrete or artificial stone, whether or not reinforced	4,494	100	100	0	0	-748	-17	0	0
292690	Nitrile-function compounds	3,966	100	83	188	0	-475	-12	0	0
870840	Gear boxes and parts thereof, for tractors, motor vehicles	3,832	100	85	173	0	-509	-13	0	0
870810	Bumpers and parts thereof for tractors, motor vehicles	3,816	100	86	170	0	-510	-13	0	0
841290	Parts of non-electrical engines and motors	3,749	100	98	24	0	-599	-16	0	0
930630	Cartridges for smooth-barrelled shot-guns, revolvers and pistols	2,613	100	100	0	0	-426	-16	0	0
870880	Suspension systems and parts thereof, incl. shock-absorbers	2,371	100	86	105	0	-317	-13	0	0
392490	Household articles and toilet articles, of plastics	2,228	100	100	0	0	-317	-14	0	0
870892	Silencers mufflers and exhaust pipes, for tractors, motor vehicles ...	2,040	100	85	92	0	-271	-13	0	0
731010	Tanks, casks, drums, cans, boxes and similar containers, of iron or steel	1,940	100	100	0	0	-313	-16	0	0
841229	Hydraulic power engines and motors	1,842	100	93	42	0	-263	-14	0	0
480610	Vegetable parchment	1,834	100	100	0	0	-321	-17	0	0
870850	Drive-axles with differential	1,779	100	85	82	0	-235	-13	0	0
820559	Hand tools, incl. glaziers' diamonds, of base metal	1,142	100	85	56	0	-154	-13	0	0
Subtotal (selected product groups)		188,250			4,214	0	-28,198		0	

Note: The list contains import sectors for which affected trade exceeds the threshold of $1 million.

Source: Authors' own calculation.

ports.[18] Yet, there is one subgroup for which inclusion is not immediately obvious. This subgroup is composed of those product groups for which imports from Russia are insignificant to the EU economy *and* Russian exports to the EU are insignificant for the Russian economy.[19] Of the

18 Indeed, this is the case for at least 81 sectors, for which the Russian share in all EU imports is insignificant (smaller than 3%), but the EU's share in Russian exports is considerable (equal or larger than 20%).

19 We define economically insignificant as shares of less than 3% of total imports and exports, respectively.

393 sectors that our model can distinguish, 62 fall into this category. EU mirror tariffs on these 62 sectors inflict only minute overall economic damage of roughly $6.6 million to Russia, with an average economic harm of $107,000 per tariff line. Setting aside the fact that for five of these 62 sectors, EU welfare losses exceed harm to Russia (more on that issue in Comment 6 below),[20] it would appear that the administrative effort of implementing and enforcing higher tariffs on these 62 sectors may easily outweigh the overall welfare gain of $1.9 million generated by EU mirror sanctions on these sectors.

Comment 6: Mirror sanctions on dozens of sectors would inflict more harm on the EU itself than on Russia

As previously alluded to, EU mirror sanctions on multiple product groups would generate EU welfare losses that exceed those inflicted on Russia. Table 7 lists 20 sectors for which mirror sanctions inflict more self-harm to the EU than they inflict harm to Russia, and for which this difference exceeds $1 million (see column (10)).[21] These sectors together affect $4.66 billion in 2021 trade (column (1)). Tariff increases in these sectors would inflict a total of $216 million welfare loss to the Russian economy (column (8)) yet cause welfare losses to the EU worth $550 million. Notable on this list is again product group HS 720712 (Semi-finished products of iron or non-alloy steel), for which the EU's tariff increases to 35% would entail self-harm in excess of $386 million, while causing "only" $156 million in welfare losses to Russia, for a highly unfavorable cost share of 248%.

Netting self-harm and harm to Russia, mirror sanctions on these 20 sectors would result in a negative difference of $334 million (column (10)), and a highly unfavorable EU cost share of 254%.

Comment 7: Target sectors with zero or negligible harm to Russia

As a special case of the previous comment, we find a considerable number of targeted product groups for which EU tariff sanctions of any kind would cause *zero* economic harm to Russia. Table 8 lists 24 large target sectors for which Russia experiences no welfare losses whatsoever following EU mirror sanctions (see column (8)). As the table shows, low levels of harm to Russia are not a function of small pre-sanction trade values.[22] Rather, in the overwhelming majority of cases, the EU simply has no importer power vis-à-vis Russian exporters. Russian exporters can thus pass on 100% of EU tariff increases to EU consumers (see column (2)), which causes economic pain uniquely in the EU, but not in Russia.[23] As columns (6) and (7) of Table 8 indicate, EU welfare losses in individual sectors can easily exceed $1 million and/or 15% of total pre-sanction import values.

Concluding remarks

During the 2022 G7 Summit, the United States announced the imposition of significantly higher import tariffs on 570 product groups from Russia. Given the constant refrain of "alignment", "acting in unison at every stage", and "unprecedented coordination on sanctions" that pervaded the G7 Summit, it appears likely that other countries will follow the United States' lead and soon impose steep tariff increases on Russian import products. In this paper, we assume that the EU, as one of the United States' staunchest allies on Russia sanctions, fully aligns its actions with the United States and imposes "mirror" sanctions of identical scale and scope.

We estimate the overall effects of these EU mirror sanctions and find that they could reduce annual welfare in Russia by $996 million per year, at the cost of $150 million per year to the EU economy. Compared to the effects generated by (actual) US sanctions, (hypothetical) EU mirror sanctions would have considerably more "bite": Not only would welfare losses to Russia generated by EU sanctions be nearly four times those generated by US sanctions, but the United States also pays a significantly higher price, in relative terms, for its sanctions than the EU would pay.

Aggregate results are insufficiently detailed, however, to permit an assessment of the sector-specific economic effects that would result if the EU were to adopt, in full, the US sanctions package. Our sectoral analysis shows that copying the US sanctions would produce mixed economic results from the EU's perspective.

On the one hand, we identified features of an EU mirror sanctions package that are conducive to maximising harm on the Russian economy while at the same time minimising self-harm to the EU:

- EU mirror sanctions would cover dozens of product groups whose inclusion generates particularly large

20 As an example, take product group HS 870891 (Radiators and parts thereof, for tractors, motor vehicles), for which Russia's share in overall EU imports is nearly zero and the EU's share in Russian exports is around 2%. EU mirror tariffs would cause self-harm of $68,000, while causing zero welfare losses to Russia.

21 To keep the number of rows in Table 7 manageable, we apply the threshold of $1 million for column (10). Without such a threshold in place, the count of sectors with a negative balance for the EU would be 72, for total EU losses of $568 million.

22 It would be trivial to highlight those product groups for which EU imports – and therefore potential Russian losses – are minuscule. This is why we selected import sectors in Table 8 for which affected trade exceeds the threshold of $1 million (column (1)).

23 See Comment 4 for an explanation of economic mechanisms at work.

welfare losses for Russia. These target sectors together affect more than $7.2 billion of EU pre-sanction imports and inflict economic harm upwards of $760 million on the Russian economy. When appropriately weighted against self-harm to the EU economy, including a subset of these sectors would appear apt.

- EU mirror sanctions would include numerous sectors for which tariff increases generate particularly high welfare gains to the EU economy. We estimate that inclusion of the top-ten sectors alone would achieve EU welfare gains of more than $360 million.

- For nearly 20 target sectors, EU mirror sanctions would result in complete disruption of import activity from Russia. This may bring with it certain policy advantages from the EU perspective, such as reduced dependency on Russian imports. However, blocked trade also entails significant economic costs, most notably welfare losses of nearly $400 million to the EU economy. These losses are over 2.5 times the harm inflicted on Russia. Thus, tariff sanctions that result in blocked trade should be undertaken only after thorough analysis that carefully considers the benefits of decoupling against the substantial economic costs of doing so.

We have also identified features of an EU mirror sanctions package that raise questions about its effectiveness for certain sectors:

- Over 60 sectors targeted by EU mirror sanctions concern (i) imports from Russia that are insignificant to the EU economy and (ii) Russian exports to the EU that are insignificant for the Russian economy. EU tariff increases on these sectors inflict only minute economic damage on Russia and welfare gains to the EU that may not outweigh the administrative costs of implementing, administering and policing tariff increases on those sectors.

- For over 70 product groups, mirror sanctions result in EU welfare losses that exceed those suffered by Russia. Notable on this list are "semi-finished products of iron or non-alloy steel", a sector for which the EU's tariff increases would entail self-harm in excess of $380 million – nearly 2.5 times the harm inflicted on Russia.

- For two dozen target sectors, EU tariffs would cause zero economic harm to Russia, because the EU lacks any market power vis-à-vis Russian exporters. Exporters from Russia are able to fully pass on higher tariff incidences to EU customers, many of whom can no longer afford Russian imports.

Ongoing coordination and alignment between sanctioning allies, as pledged by G7 leaders, are important actions to achieve continued economic pressure on Russia. Allies increase the effectiveness of their sanctions by synchronising the timing of sanctions and instruments chosen (import tariffs, in the case at hand). However, when it comes to the product level, adopting identical measures – selection of target products and tariff levels in this case – may prove to be economically suboptimal.

Considering the mixed results reported in this paper, the EU may wish to conduct its own thorough evaluation, rather than simply signing on to the tariff sanction package implemented by the United States in July of 2022. One option for the EU is to carefully select a subset of sectors from the US sanction package. Alternatively, the EU could design its own suite of tariff sanctions – a package that is fine-tuned to its economic relations with Russia. With the help of an evaluation tool similar to the one presented here, the EU (or any other sanctioning ally, for that matter) could avoid some of the weaknesses exposed above, and pinpoint those import sectors for which the trade-off between maximising harm to Russia and minimising self-harm is optimal. A sanctions package by the EU tailored to its economic relations with Russia may in fact be preferable also from the perspective of its allies, because the economic harm to Russia generated by such sanctions plus the current US tariff sanctions may easily surpass that of the combined effect achieved by US and EU mirror sanctions.

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DOI: 10.1007/s10272-022-1075-0

Intereconomics, 2022, 57(5), 306-312

JEL: J61, F23

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Goodbye China: What Do Fewer Foreigners Mean for Multinationals and the Chinese Economy?

The number of foreigners living in China is very low in international comparison and has further declined recently. While the strict COVID-19-related travel restrictions played a major role in this decline, there are indications that the decline started in part before the pandemic and may well continue once the pandemic-related restrictions are lifted. Against this background, this article discusses the economic challenges that the reduction in the number of foreigners is causing for Western multinationals operating in China and to the Chinese economy more generally. The consequences could spill over to the world economy and reinforce economic and technological decoupling tendencies between China and the West.

According to preliminary results of the 2020 National Census of China, there were 845,697 foreigners and an additional 584,998 residents of Hong Kong, Macao and Taiwan – together 1,430,695 immigrants[1] – living in mainland China on 1 November 2020 (NBSC, 2021). This was a substantial increase of 410,550 immigrants (40.2%) compared to the previous Census of 2010. The increase was greater for foreigners (251,865; 42.4%) than for residents of Hong Kong, Macao and Taiwan (158,685; 37.2%). Still, the total number of immigrants amounted to just 0.1% (and that of foreigners to just 0.06%) of China's population of more than 1.41 billion people.[2] This is an exceptionally low share not only compared to Western countries such as the United States (15.4%), Germany (15.7%) or France (12.8%) but also compared to China's East Asian neighbours Japan (2.0%) or South Korea (2.3%), or even compared to the similarly populous – but economically less developed – India (0.4%) (UNDESA, 2022).

In addition, the overall immigration growth rate of more than 40% from 2010 to 2020 is the result of very heterogeneous developments across Chinese provinces. While the number of immigrants in Yunnan Province in South China has increased by about 700% (from 47,396 to 379,281) between 2010 and 2020,[3] the number of immigrants has actually decreased in several other provinces. This is true, in particular, for the municipalities Shanghai and Beijing where the number of immigrants has decreased by about 21.4% (from 208,602 to 163,954) and 41.5% (from 107,445 to 62,812), respectively. And, although the preliminary results of the 2020 Census published so far do not provide the numbers of foreigners for individual provinces, given the exceptional development of the number of immigrants in Yunnan, it can reasonably be assumed that the aggregate number of foreigners in the other 30 Chinese provinces has actually declined between 2010 and 2020 by roughly 80,000 persons or about 14.5%, according to a back of the envelope estimation.[4]

1 Immigrants in this paper include residents from Hong Kong, Macao and Taiwan as well as foreigners from outside the Greater China region living in mainland China.

2 This figure refers to mainland Chinese living in China, i.e. excluding immigrants in mainland China.

Open Access funding provided by ZBW – Leibniz Information Centre for Economics.

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3 In Yunnan, the large majority of foreigners are migrant workers from neighbouring countries Vietnam, Myanmar and Laos, who have been attracted by large disparities in labour markets between Yunnan and these neighbouring countries. In addition, there has been a booming cross-border marriage market, attracting many migrant women to Yunnan. Percentage of immigrants in Yunnan as a share of all immigrants in China has increased from less than 5% in 2010 to about 27% in 2020.

4 The estimation assumes that the number of residents from Hong Kong, Macao and Taiwan in Yunnan has grown at the same rate as for China as a whole (37.2%).

As the National Census was carried out in late 2020, it has already been affected by the COVID-19 pandemic and the strict travel restrictions imposed in response (see below). By this time, an unknown number of immigrants had already left China and/or were unable to enter or return to China due to these strict travel restrictions. Given that foreigners, including expatriates from Western countries, have more likely been directly affected by these restrictions than residents from Hong Kong, Macao and Taiwan, these restrictions have certainly contributed to the particularly strong decrease in the number of immigrants in Beijing and Shanghai, where the number of foreigners has been substantially higher than the number of residents from Hong Kong, Macao and Taiwan.[5]

Additionally, there is evidence showing that the decade-long increase in the number of foreigners living in China had already come to a halt or even reversed in China (outside Yunnan) several years before the COVID-19 pandemic. Take Shanghai, the most international city in China, as an example. While the number of foreigners increased substantially from 100,011 in 2005 to 174,192 persons in 2012 (roughly 8% annual growth rate); it only increased to 178,335 persons in 2015 (roughly 0.8% annual growth rate) and then decreased to 172,076 in 2018 (SBS, 2014-2019). A similar trend reversal can be observed among German citizens living in China. According to the 2010 Population Census, Germans were the second largest group of Europeans living in China in 2010 (NBSC, 2012). According to the German Statistical Office, in each year from 2001 to 2014, the number of German citizens moving from Germany to China exceeded the number of Germans re-migrating from China to Germany, resulting in a net migration of 6,325 Germans to China between 2001 and 2014 (Destatis, 2022). In contrast, in each year between 2015 and 2020, more Germans moved back to Germany from China than the other way around, leading to a net remigration of 4,159 Germans back from China to Germany during this period.

China's immigration policy

Given its large population and its developing economic status, China does not perceive itself as a potential immigration country. Accordingly, the development of China's immigration policy has been the result of a perceived need for China to control and regulate increasing immigration flows rather than attempt to actively promote immigration or facilitate the integration of immigrants into the Chinese economy and society.

5 In Beijing and Shanghai, the shares of foreigners were about 84.8% and 68.8%, respectively, of the total number of immigrants in 2010 (NBSC, 2012).

China's Exit and Entry Administration Law, which was passed in 2012, marked an important turning point in China's immigration policy. Over the more than three decades from the beginning of China's open-door policy to the 2012 law, China's legal and administration framework for immigration control and management had been highly fragmented and lacked coordination (Zhu and Price, 2013; Pieke, 2014). A large number of central and local authorities were involved in entry procedures, and the communication and cooperation between them was highly deficient. This framework was inadequate to cope with the economic, social and security challenges resulting from the surging number of legal and illegal immigrants that followed China's access to the World Trade Organization in 2001 (Zhu and Price, 2013). The 2012 law reflected the Chinese government's recognition that China needed a more comprehensive regulatory framework for immigration in order to further its national development goals. It provides for an immigration policy that strongly differentiates the treatment of foreigners by their perceived benefits to the Chinese economy. While particularly highly skilled foreigners are wanted and welcome given their potential benefits for China's economic development, the entry of illegal or less desirable foreigners and their stay in China are to be more strictly controlled and countered than before in the interest of national and social security.

To be sure, China's strong preference for attracting high-skilled immigrants was not first established by the 2012 law. Already in 2004, the Measures for the Administration of Examination and Approval of Foreigners' Permanent Residence in China gave preference to foreigners whose qualifications meet certain pre-determined criteria. In 2008, the Thousand Talents Program was initiated to actively attract highly skilled professionals for advanced research, innovation and the establishment of high-tech start-ups in China. Since at that time the criteria for the so-called preferred high-skill professionals were still very high and the policy measures were carried out only selectively without comprehensive coordination and supplementary hands-on measures, their impact on attracting foreigners, especially those without an ethnic Chinese background, were rather limited (Wang, 2012). Since the 2012 law, the scope of the related policies to attract high-skilled foreigners has become broader, reflecting President Xi Jinping's repeated emphasis of the importance of these talents to support China's innovation-driven economic development. The rules and regulations related to immigration were further consolidated and focused in favour of highly qualified foreigners with the introduction of the Permit for Foreigners to Work in China in 2015. This regulation, which was implemented nationwide in 2017, formally established a strict grading system for foreigners

to help China more effectively attract international professionals in line with domestic demand.

Also in 2015, the Chinese authorities started to implement measures to ease the visa and residence application procedures and expanded immigration services for targeted foreign professionals/high-skilled foreign nationals, at first on an experimental basis in a number of selected pilot free trade and demonstration zones. In August 2019, several of these policies (relating to the facilitation of visas and residence permits, including long-term or permanent residence permits for specific high-level foreign talent and the establishment of immigration service centres) have been implemented nationwide to encourage, support and facilitate foreign talent, outstanding young foreigners and overseas Chinese to start businesses, invest, innovate, study and work in China (Ministry of Public Security, 2019).

In view of the consolidation of the legal framework and the (selected) facilitation of visas and residence approvals, China's immigration policy has become overall more favourable for particularly high-skilled foreigners since 2012. By contrast, for most less skilled migrants, Chinese immigration policies have become rather more restrictive due to stricter enforcement of the restrictive entry and residence regulation for this group. At the same time, Chinese public attitudes towards foreigners have become more divided, and public resentment towards foreigners has been on the rise since about 2015 (Speelman, 2020). Against this background, in 2020 the announcement of a public consultation on the Regulations Governing the Permanent Residence of Foreigners, which is intended to better regulate and also ease foreigner's permanent stay in China, met with strong headwinds and harsh criticism from the public. These strong public reactions, particularly on social media, even forced the responsible authorities to offer public assurance that the regulations will be further "improved" and will not be enforced hastily.

COVID-19-based travel restrictions and the decline in the number of foreigners

Since March 2020, China has implemented strict travel restrictions to deal with the threat of the COVID-19 pandemic. The restrictions imposed included a drastic reduction in the number of international passenger flights in and out of China, broad restrictions on the issuance of visas combined with more complex and time-consuming application procedures than before, strict vaccination requirements and stringent COVID-19 testing and quarantine requirements both prior to and after arrival in China. Despite some adaptations in response to the changing global pandemic situation, strict travel restrictions have remained in place at least until mid-2022 (the time of writing).

As a consequence, the number of people, and in particular the number of foreigners, crossing China's border decreased dramatically over the past two years. The number of border crossings by foreigners decreased from 97.7 million in 2019 to 13.2 million in 2020 and to a mere 4.5 million (-95.4%) in 2021 (NIA, 2020, 2022). In light of these developments, the number of foreigners living in China has likely further declined since the reference date of the 2020 National Census (1 November 2020). And given the continuation of COVID-19-related restrictions and the COVID-19 outbreaks and related strict lockdowns in, for example, Jilin and Shanghai in spring 2022, it is likely that the number of foreigners living in China will decline even further in the near future. In a recent survey among foreigners in Shanghai conducted during the strict and long lockdown of the municipality in April 2022, 85% of the 950 respondents said that the lockdown has made them rethink their future in China. Furthermore, 22% and 26%)of respondents said they want to leave China as soon as possible or within 12 months, respectively. Only 15% of respondents still planned to stay in China for the long haul (That's Shanghai Magazine, 2022).

Implications for Western multinationals in China

The COVID-19-related travel restrictions and the associated decline in the number of foreigners in China have had significant negative consequences for many Western companies. Business surveys conducted by various chambers of commerce in China in 2021 have found that travel and entry restrictions due to the COVID-19 pandemic and related human resource challenges were by then considered to be among the most pressing operational business challenges for Western companies active in China. British companies in China surveyed in autumn 2021, for example, rated "employing foreign staff" the most burdensome challenge for doing business in China in 2021. At the time of the survey, 43% of the British companies had existing or new foreign employees outside China that were unable to enter the Chinese mainland due to COVID-19-related problems of booking suitable flights, securing visas for themselves or their dependents or because they were unwilling to quarantine (British Chamber, 2022).

The travel and entry restrictions have significantly exacerbated the problems many Western companies in China face in attracting and retaining foreign talent. Among the European companies surveyed in February 2021, more than 60% of respondents ranked "entry restrictions into China due to COVID-19" as one of their top three challenges for attracting and for retaining international talent in

China at that time (European Chamber, 2021a). More than three quarters (and almost one-third) of American companies in China surveyed in autumn 2021 considered it a significant challenge for retaining and recruiting international talent in China that qualified candidates were unable (and unwilling, respectively) to move to China due to the COVID-19 restrictions (AmCham China, 2021).

The COVID-19-related travel and entry restrictions have thus led to a reduction of the number (shares) of foreign staff employed by Western companies in China. For example, in autumn 2021, 23% of British companies surveyed reported a net decrease (vs. only 3% reported a net increase) in foreign employees over the past year (British Chamber, 2021). For 2022, 41% of British companies expected that "a significant number of foreign employees will leave China indefinitely", mainly due to emotional strain of prolonged separation from friends and family or challenging travel requirements and logistics (British Chamber, 2021, 23). US companies in China reported an even stronger impact of COVID-19 restrictions on foreign employment. In late March 2022, about 28% of US firms surveyed stated that they had reduced their foreign staff in China due to COVID-19 restrictions by more than 20% since the beginning of the pandemic, and another 13% of firms by between 10% and 20%. About 44% of companies expected a further loss of foreign staff, if "current COVID-19 restrictions remain in place for the next year" (AmCham China and AmCham Shanghai, 2022).

In line with the general decline in the number of foreigners in China, the reduction in the number or share of foreign employees in many Western companies in China did not just start with the pandemic. According to the German Chamber (2021), for example, the average percentage of foreign employees in German companies in China had been declining well before the outbreak of the pandemic, decreasing from 7.1% in 2016 to 6.3% in 2019 and further to 5.4% in 2021. When asked about the reasons for replacing foreign employees with local employees, 30% of responding firms named COVID-19 visa restrictions and 26% the visa process in general. However, also about 60% of responding firms named the wage level, about 37% better business contacts and 35% (high) qualifications of local employees (German Chamber, 2021).[6]

Given the difficulties that companies currently encounter in attracting and retaining foreign employees, the decline in the number of foreign employees will likely continue. And as the reasons for these difficulties are not limited to pandemic-related restrictions, the decline is likely to continue even after a (future) lifting of these restrictions. According to the European and American companies surveyed, those reasons include the unwillingness of qualified candidates to relocate to China, high expectations of salary or high costs of living and payroll costs, a lack of affordable, quality education for children, poor air quality, internet/media restrictions, and importantly in the case of American companies also bilateral tensions and geopolitical concerns (European Chamber, 2021a; AmCham China, 2022).

Despite COVID-19-related travel restrictions and increasing difficulties in retaining and recruiting foreign professionals to support their business operations in China, Western companies surveyed generally continue to view China as a key market and an attractive investment location for the near future. In autumn 2021, almost half of British companies surveyed and a large majority of US and German companies planned to increase their investment in China over the next year or two (British Chamber, 2021; AmCham China, 2022; German Chamber, 2022).[7] Rather than reducing their China engagement, many companies have apparently responded to the challenges by further increasing their localisation efforts. For some time now, the majority of European companies operating in China have been producing in China primarily for the Chinese market and have increasingly been relocating their procurement (supply chains) and in some cases also their R&D for the Chinese market to China (European Chamber, 2021b). In recent years, many companies have further intensified their localisation efforts to cope with economic and technological decoupling tendencies spurred by political tensions between China and mainly the US but also Europe (European Chamber, 2021b; German Chamber, 2022). COVID-19-related travel restrictions appear to have reinforced this localisation trend by (further) increasing local sourcing and local R&D activities, and transferring technical and operational know-how and decision-making power to the Chinese subsidiaries (German Chamber, 2022b).

6 About one quarter of respondents named the Individual Income Tax (IIT) reform, which was planned to take effect on 1 January 2022, but was postponed by two years in December 2021. The reform stipulated the elimination of tax exemptions for certain benefits for foreigners (e.g. for housing expenses, children's education expenses, language training expenses and home leave expenses), which would have resulted in larger tax liabilities for many foreign employees.

7 The Omicron outbreaks and subsequent strict lockdowns in Shanghai and several other Chinese provinces in spring 2022 seem to have soured the investment plans of US companies in China, however. By end of March 2022, 17% (29%) of the respondents to a small-scale survey of American companies in China stated that the recent Omicron outbreak led to a decrease (delay) of planned investments. About 50% of companies said they would reduce investments if the current COVID-19 restrictions remain in place for the next year (AmCham China and AmCham Shanghai, 2022).

Overall, the survey results suggest that the replacement of foreign by local employees is in part a natural, efficiency-enhancing process, in which Western firms take advantage of the growing reservoir of highly qualified Chinese workers with well-established local connections to reduce (labour) costs and leverage the specific knowledge and connections of local workers. The results also suggest, however, that many companies are being forced to accelerate this process – beyond what they consider optimal – due to significant difficulties in attracting and retaining foreign employees. In this case, the (forced) replacement of foreign experts by local talent may lead to substantial efficiency losses, e.g. in terms of international coordination and knowledge transfer within the multinational company. Although the number of foreign employees in Western companies in China is generally relatively small, they usually hold critical positions that require special skills, and they are of great importance in terms of corporate culture and the diversity of views in decision-making processes (European Chamber, 2021a).

Implications for the Chinese economy

China's long-term development goal as emphasised in the 14th Five-Year Plan for 2021-2025 is to promote high-quality development that should be innovation-driven and predominantly fuelled by the Chinese domestic market. Two cornerstones of this new development strategy thus are: first, promoting China's self-reliance and self-improvement in science and technology, and second, strengthening China's domestic economy and promoting self-contained domestic supply chains (Bickenbach and Liu, 2021).

The observed increase of local sourcing and local R&D activities of Western companies over the past years and the amplification of these localisation trends by the COVID-19-related travel restrictions may, at least on the surface, be in line with the goals emphasised in the Five-Year Plan. Other consequences, however, run rather counter to the stated goals of the Chinese leadership. The loss of foreign experts and China's reduced attractiveness to foreign talent as well as a decrease in knowledge exchange with headquarters abroad that was observed by many Western companies (e.g. German Chamber, 2022) are expected to have a negative impact on China's innovation capacity and development. This will be felt not only by foreign companies operating in China but also by domestic Chinese companies and the Chinese economy as a whole, including through reduced knowledge spillovers and learning effects.

In several key areas, Chinese companies are currently still far from the technological leadership that the Chinese government seeks. The desired greater self-reliance in science and technology therefore does not mean that China does not want (or need) to continue to benefit from foreign knowledge. In addition to an increased promotion of its own research and innovation, China will continue to seek knowledge and technology transfers from abroad. According to the Five-Year Plan, China plans to increase its efforts to attract technology-leading foreign companies and their research activities, as well as foreign scientific and technological talent. In addition, Chinese direct investment abroad and targeted acquisitions of leading foreign companies in knowledge- and technology-intensive industries are also likely to continue to be pursued (Xia and Liu, 2021).

Similarly, China's aim of strengthening the domestic market and promoting self-contained domestic supply chains should not be interpreted as a general retreat from promoting foreign trade and investment. The Chinese government also aims to further strengthen China's position as a leading trading power and to foster its development towards a manufacturing superpower. For many specific technologically and qualitatively demanding (intermediate) products, companies in China are currently still dependent on imports and suppliers from outside China. China will therefore further need foreign trade and investments and the transfer of foreign knowledge to achieve its goals.

Worldwide, the COVID-19 pandemic and governments' policies to contain the disease have led to a sharp decline in international trade and foreign direct investment (FDI) in the first half of 2020. Due, in particular, to a relatively successful containment of COVID-19 infections in China, the Chinese economy recovered earlier than many other economies. China thereby contributed substantially to the recovery of global trade and foreign investment flows, which surpassed their pre-pandemic levels already in 2021 (UNCTAD, 2022a, 2022b). Now, there is a serious risk, however, that the further development of the Chinese economy and particularly its foreign trade and investments will be impeded by China's continuing travel restrictions and recurring lockdowns, and in a more long-term perspective by a continuing decline in the number of foreigners in China.

While the negative short-term economic effects of the strict travel restrictions and lockdowns are already apparent (NBSC, 2022), it is still too early to empirically assess the longer-term economic impact of fewer foreigners living in China. The general literature on the relation between immigration and trade, investment and innovation clearly suggests, however, that the reduced number of foreigners in China is likely to have a negative impact on

China's foreign trade and investment as well as on its innovation and growth.

A large number of empirical studies have clearly confirmed that international migration and the presence of foreigners increase international trade and FDI (Hatzigeorgiou and Lodefalk, 2021).[8] Immigrants boost demand for products or services from their home country, which is satisfied by increased imports or by companies from the migrants' home country that invest and produce these products in the migrants' host country. In addition, and more importantly in general, migrants can facilitate and promote international trade and investment by reducing information and transaction costs. They can provide information about products, preferences, business practices, etc. in foreign markets, improve communication between host and home countries, or reduce the costs and uncertainties of negotiating and enforcing contracts between trade or investment partners in the two countries (Hatzigeorgiou and Lodefalk, 2021; Cuadros et al., 2019). Overall, the relevant empirical literature confirms significant positive effects of immigration on both bilateral trade (imports as well as exports) and bilateral FDI (inward as well as outward FDI) between migrants' host and home countries (Hatzigeorgiou and Lodefalk, 2021). As for the relevance of personal characteristics of migrants, it seems that it is mainly migrants' occupations rather than their education levels that determine their effect on trade and FDI. In particular, migrants in occupations that are more closely related to business decisions, such as managers and, to a lesser extent, professionals seem to have a positive impact on trade (Martin-Montaner et al., 2014) and FDI (Cuadros et al., 2019).

International migration is generally also advantageous for fostering innovation in the host countries (Breschi et al., 2016; Venturini et al., 2018). High-skilled immigrants bring with them skills and knowledge that are generally in high demand in the host countries and provide complementary inputs that are crucial for knowledge creation and innovation (Stephan and Levin, 2001). Their different cultural backgrounds increase local cultural diversity which fosters creativity and has a positive impact on patenting and innovation and entrepreneurship, especially in knowledge- or technology-intensive sectors (e.g. Rodríguez-Pose and Hardy, 2015; Niebuhr, 2010). The generally more risk-loving attitude of migrants (Huber and Nowotny, 2020) is an additional feature favouring the uptake of innovation and entrepreneurial activities. The presence of foreign managers and experts in the local subsidiaries of foreign multinationals facilitates an international knowledge transfer within the multinationals and increasing productivity in the subsidiaries (Golob Šušteršič and Zajc Kejžar, 2019), which may then spill over to local firms particularly with increasing localisation of R&D activities of the multinationals.[9]

In light of these general findings, fewer foreigners living in China may mean that China misses opportunities to further intensify its international engagement via trade and investments, to speed up innovation and to achieve its ambitious growth and development goals.

Conclusions

In several Chinese provinces, including some of its most international ones like Beijing and Shanghai, the number of immigrants has declined in 2020 compared to 2010. Over the more than two years of pandemic-related travel restrictions, the number of foreigners crossing China's border has decreased dramatically and the number of foreigners permanently living in China has further declined. Given the continuation of strict COVID-19 restrictions, China's selective and still quite restrictive migration policy, and the increasing resentment among the public toward foreigners, the number of foreigners living in China may well decline even further in the future.

The travel restrictions and declining foreign workforce have posed huge challenges for both Western multinationals operating in China and the Chinese economy as a whole. Many multinationals appear to have responded to these challenges by further increasing their localisation efforts, partially rather out of necessity and at the expense of firm performance. For China as a whole, the declining number of foreign experts means that the country may miss opportunities for beneficial foreign trade and investments as well as technology transfer and innovation, leading to losses in growth and development potential.

The effects of China's declining foreign workforce and foreign population more generally are not confined to the Chinese economy exclusively, however. They are ex-

8 Most of the studies on the relation between immigration and trade and immigration and FDI relate to the effects of immigration to North American or European countries. The validity of the results for immigration to China is therefore empirically still an open question. From a theoretical perspective, however, the trade and investment promoting effects of migrants are expected to be larger for countries that are less similar culturally and for less developed countries, where institutions are weaker and doing business with foreigners entails a higher degree of insecurity. Migrants may therefore be expected to have a particularly large impact on Western companies' trade and investment relations with China.

9 Most of the studies on the migration-innovation nexus focus on the US and Europe as host countries. Findings from Bahar et al. (2022) suggest, however, that the positive innovation impact of international migration is not limited to the developed countries, but have also helped to increase innovation in emerging economies.

pected to spill over to the world economy, above all, via its negative impact on international trade and investment. Europe, with its many companies operating in China and intensive trade and investment relations, is likely to be affected particularly strongly. The "people-to-people decoupling" spurred by travel restrictions and the declining number of foreigners in China more generally could become another amplifier of the more general economic and technological decoupling tendencies between China and the West. And it will further reduce mutual understanding between China and the West not only in business but also in politics and society at large.

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Intereconomics, 2022, 57(5), 314-321

JEL: Q40, Q42, Q48

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How Can the European Union Adapt to Climate Change?

Europe must increasingly deal with the harmful impacts of climate change, regardless of its success in reducing emissions. These impacts have significant cross-border effects and threaten to deepen existing divisions. Cooperation on adaptation, which is mostly seen as requiring local or regional efforts, may be useful, but the role of the European Union is ill-defined. This article gives an overview of how climate change might transform Europe and how it might affect people and the economy. It also discusses on what grounds adaptation policies should be pursued at the EU level. The article argues that a stronger adaptation governance framework would benefit adaptation efforts and formulates three ideas to strengthen adaptation. The first is a three-layered governance framework based on intensive cooperation to establish binding adaptation plans. Second is an EU-level insurance scheme against damages from climate change, with the size of national contributions tied to the achievement of targets in adaptation plans. The final suggestion is to increase *ex ante* adaptation funding by targeting more spending under EU regional and agricultural policies specifically to adaptation in the most vulnerable regions.

Projections made after the 26th UN Climate Change Conference in Glasgow in 2021 show that even if the European Union's ambitious commitment to climate neutrality by 2050 succeeds, global average temperatures may still rise to 2.4°C above pre-industrial levels by 2100 (Stockwell et al., 2021). The effects of climate change will moreover be felt even in the increasingly unlikely scenario that global warming is limited to 1.5°C. In addition to mitigating climate change, major efforts will therefore have to be made to adapt societies.

Most climate action at the EU level focuses on mitigation. Adaptation – efforts to avoid, limit or manage the harmful effects of climate change on human and natural systems – is mostly a regional and local issue. Nevertheless, the EU is also moving on this front, and with good reason. Science predicts that southern (and south-eastern) EU countries could be affected more significantly than their northern counterparts, exacerbating existing tensions. Furthermore, the broad effects of climate change touch on various policy fields that are within EU competences, and there are many cross-border aspects and instances of scale advantages. It remains, however, difficult to exactly delineate where and how the EU should step in, especially since adaptation to climate change still involves learning-by-doing.

The aim of this paper is to contribute to this debate. To set the scene, we first give an overview of what may be ahead for Europe in terms of physical climate change and economic loss. We then discuss the arguments invoked to warrant EU intervention in terms of adaptation. Finally, we propose ideas to strengthen the governance of climate adaptation efforts in Europe.

The impact of climate change on Europe

Physical effects

Global average surface temperatures have so far risen by 1.1°C since pre-industrial times (IPCC, 2021). Land temperatures in Europe, however, have been rising much

Open Access funding provided by ZBW – Leibniz Information Centre for Economics.

* We thank Stavros Zenios and other Bruegel colleagues for their valuable comments and suggestions.

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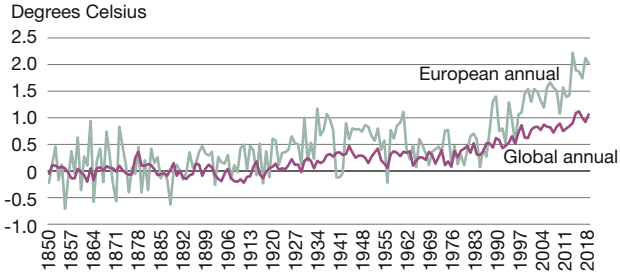
Figure 1
Global and European average near-surface temperatures relative to pre-industrial period 1850-1900



Source: EEA (2021a), HadCRUT4 (mean) estimates.

faster, to about 2°C above pre-industrial levels (Figure 1). With rising average temperatures, all of Europe is also seeing more frequent and intense extreme weather phenomena today than it did during much of the previous century – more summer heatwaves, heavy precipitation and droughts – as well as rising sea levels (IPCC, 2021).

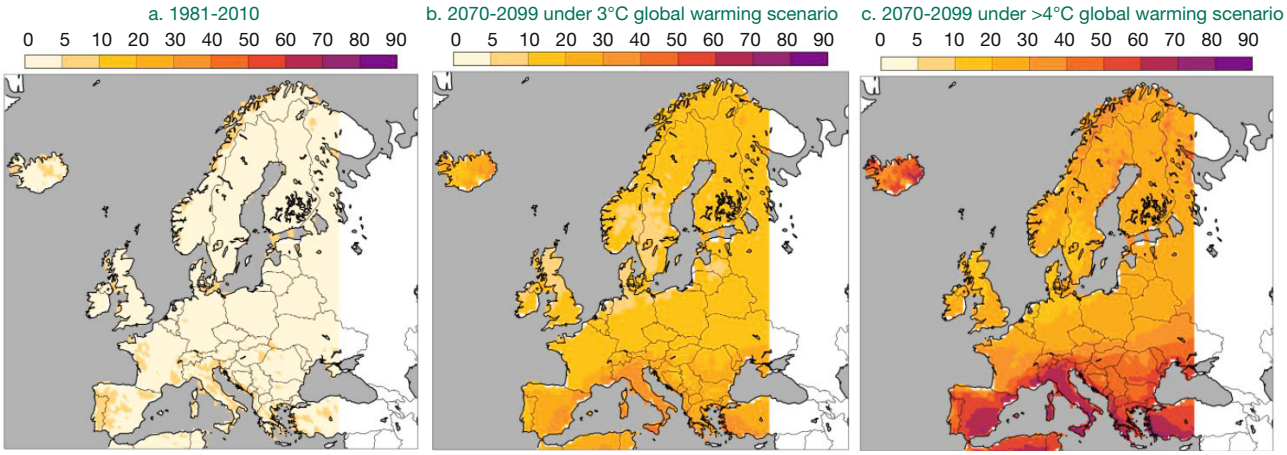
The specific impacts of climate change differ across regions: all regions are seeing higher temperatures today, but the rise of mean temperatures has so far been fastest in central and eastern Europe, and in the very south, with more than 0.4°C of warming per decade on average since 1960 (EEA, 2021a). Unlike the rest of Europe, the south has not seen a clear increase in heavy precipitation and river flooding. Instead, it has suffered more from droughts, as has western Europe (IPCC, 2021).

Projections of different global warming scenarios for Europe indicate three main things about the future: that it matters greatly how successful efforts are to reduce greenhouse gas emissions; that all of Europe will be affected; and that in most scenarios, southern and southeastern Europe will face the biggest impacts of climate change on multiple fronts.

Average temperatures will increase in all regions throughout this century, but patterns vary depending on the season. Mountainous areas and the northern and southern edges of Europe will experience the largest temperature increases overall, especially in the summer, with mean temperatures that will be between 2°C and 2.5°C warmer than today by the end of this century, even in a scenario in which global warming stays below 2°C (Feyen et al., 2020; Climate-ADAPT, 2022a).[1] Since southern Europe already has a warmer climate, it will be particularly affected by more frequent heatwaves that are harmful to human health (Figure 2).

1 For simplicity we use *likely* upper bounds of global average temperature increases by 2100 to refer to global warming scenarios that were presented in the Fifth Assessment Report of the IPCC (2014a). The 2°C scenario refers to RCP 2.6, a Representative Concentration Pathway in which CO_2 emissions start to decline by 2020 and reach zero in the second half of this century. The 3°C scenario refers to RCP 4.5, in which CO_2 emissions remain at current levels until 2050, after which they start declining. The > 4°C scenario refers to RCP 8.5, in which emissions continue to rise as before.

Figure 2
Annual number of health-affecting heatwave days

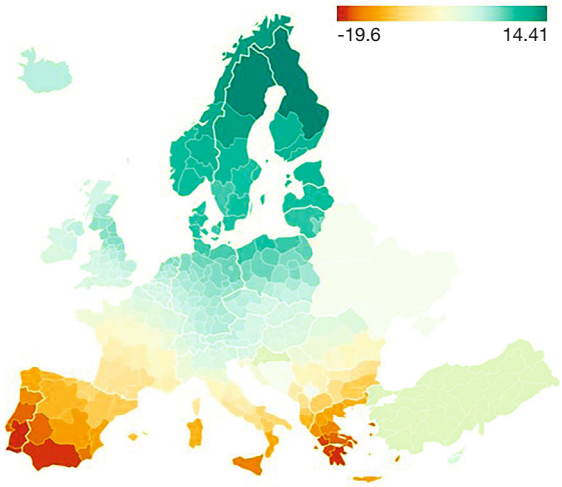


Note: A health-related heatwave is considered to be a period of at least 2 consecutive days on which the maximum apparent temperature (Tappmax) exceeds the 90th percentile of Tappmax and the minimum temperature (Tmin) exceeds the 90th percentile of Tmin. Health heatwaves are calculated for each month of the summer period between June and August. The apparent temperature is a measure of relative discomfort due to combined heat and high humidity.

Source: Climate-ADAPT (2022b), based on Copernicus Climate Change Service data.

Figure 3

Projected percentage change in annual precipitation by mid-century (2041-2070) by region (NUTS2), in a high-emission scenario (> 4°C)



Source: Climate-ADAPT (2022c).

Precipitation will change too. In an optimistic emissions scenario compliant with the Paris Agreement (global warming stays below 2°C), most regions in Europe will see an increase in annual average precipitation, mostly in winter (roughly 5% to 10% more than today). Summer months, however, may become dryer in the south particularly on the Iberian Peninsula. In a high-emission scenario (global warming >4°C), the contrasts will be much starker (Figure 3). The whole south will be much dryer throughout the year, with up to 20% less rainfall than today by the middle of the century and 30% less by 2100. Wildfires and droughts may therefore become increasingly frequent and serious problems for the Mediterranean region. Northern Europe, on the other hand, will become significantly wetter on average, even though in the summer many north-western regions, including France, Benelux, Britain and Ireland, will see less rainfall than today (Climate-ADAPT, 2022c). Rainfall that is more concentrated in time is expected to result in river flooding more often in these regions (EEA, 2021b).

Even the frequency of extreme sea levels and coastal floods is expected to increase much more in the south than in the north. By 2100, sea-level surges that historically would occur once every century may return as much as several times a year along the Mediterranean and Black Sea coasts in a high-emission scenario (>4°C), while they may happen once every one or two years along northern shorelines. In an intermediate scenario (3°C), the probabilities decline to around once a year and a few times each decade, respectively (EEA, 2021c).

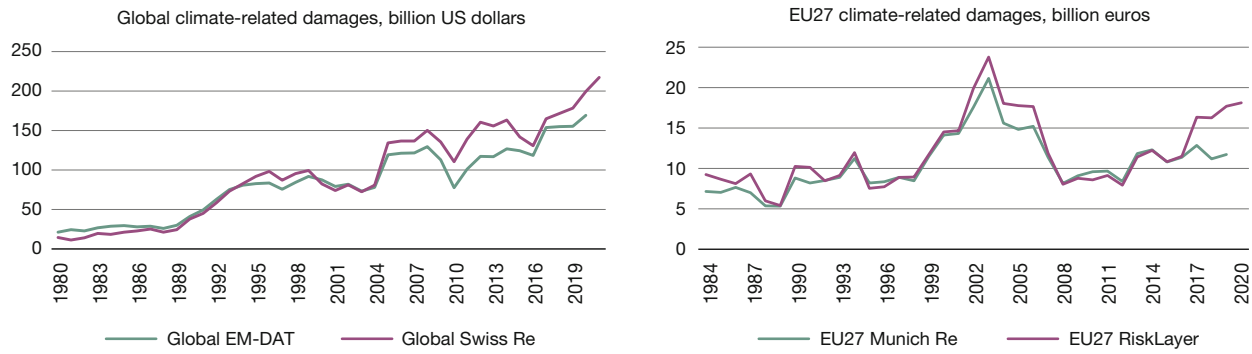
Damages and economic impacts

The fact that climate change is already underway is reflected in a clear upward trend in global estimated losses from climate-related disasters. There is, by contrast, not yet such a trend in the EU, due to the outsized damages from single events in Europe (Figure 4). But the yearly number of reported climate-related disasters in Europe is increasing. It is reasonable to assume that as both the frequency and intensity of extreme weather events grow, so will the material damages from such single disasters, especially as the value of exposed assets grows because of continued building on flood plains, for example.

Figure 4

Historic damages from climate-related natural events worldwide and in the EU

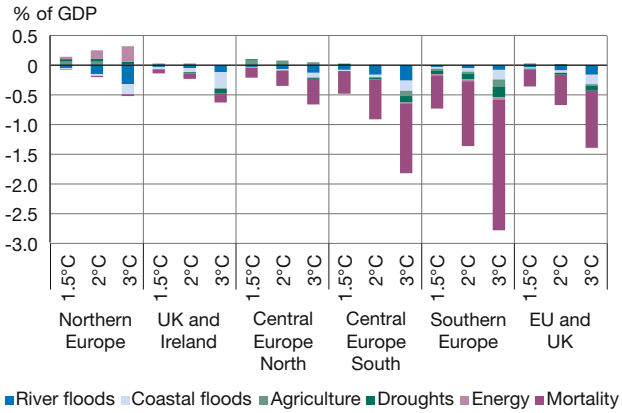
Five-year moving averages



Sources: CRED/UCLouvain (2021), EM-DAT; Swiss Re Institute (2022); EEA (2022).

Figure 5

Estimated welfare loss from future climate impacts if applied to today's economy, by region and level of global warming



Source: Feyen et al. (2020).

Estimates based on a static model by the European Commission's Joint Research Centre (Feyen et al., 2020) show how much welfare loss the current EU economy could suffer if it were subject to different global warming scenarios, compared to today's climate (Figure 5). Feyen et al. (2020) considered general equilibrium effects of damages from river floods, coastal floods, droughts, windstorms and human mortality from extreme heat, as well as declining agricultural yields and the impact of water scarcity on energy supply (see Behrens et al., 2017). Total EU28 (including the United Kingdom) welfare losses per year would be at least €175 billion with a temperature rise of 3°C, €83 billion with 2°C and €42 billion with 1.5°C.

Regions that are more affected by climate change are also likely to suffer greater material losses, particularly if these places are less prepared, as data from, for example, ND-GAIN (2022) suggests. The Commission's results confirm that southern Europe would be affected the most, with a yearly loss of 1.3% of GDP with 2°C of global warming compared to an average for the EU28 of only 0.7%.[2] The results are mostly driven by mortality from extreme heat, without which losses are more similar across different regions. Strikingly, Scandinavian countries could enjoy net economic gains, as increased energy output and agricultural production outweigh the impact of more floods. No region has net gains in a 3°C warming scenario, but the net losses for countries north of the Alps (0.2% to 0.6% of GDP) are clearly less than those incurred by southern and south-eastern countries, which would reach up to 2.8% of GDP.

These impact estimates are conservative according to Feyen et al. (2020). They do not account for all possible climate impacts or tipping points (loss of labour productivity, reduced tourism, destabilised mountainous terrains, ecosystems, etc.), and they only apply estimated climate change effects to today's economic output, without taking into account possible long-term growth effects.[3] Finally, they say nothing about how climate change might disproportionately affect disadvantaged groups (IPCC, 2014b).

Why should the EU act?

The legal basis for action on climate change adaptation is provided by the EU treaties,[4] which state that the EU's environmental policy should also contribute to the protection of human health and the prudent and rational use of natural resources, based on the precautionary principle and on preventive action. The European Climate Law (Regulation (EU) 2021/1119) also calls explicitly for the EU and member states to make progress on adaptation, and it contains provisions about mandatory adaptation strategies, assessments of progress, consistency of adaptation measures and adaptation mainstreaming.[5]

The responsibility for adapting to climate change is thus shared by member states and the EU. According to the subsidiarity principle, the EU should therefore intervene where member state action is not sufficient to achieve the desired objectives, while leaving other decisions as much as possible to citizens. This is typically a question of scale advantages and cross-border spillovers, as well as of how other EU competences are involved. Such considerations are clearly reflected in the EU's most recent climate change adaptation strategy (European Commission, 2021b).

An important example where scale plays a role is in the sharing of scientific knowledge. While local and regional governments have the best insight into local environmental, social and economic circumstances, they often lack the scientific capacity to identify vulnerabilities in the face of climate change, or to develop adequate policy responses. There is a clear benefit in pooling capacities at EU level to expand scientific knowledge on current and future climate impacts through, for example, satellite-based earth observation programmes like Copernicus, which are beyond the capacity of national governments. Knowledge generated at the EU level can then be used as a public good by all, for example through the dedicated

2 Note that these are not projections of damages to assets, but losses in GDP. Estimates of future damages from the same study are higher, e.g. €111 billion per year from coastal flooding alone (EU-wide) in a moderate-emission scenario without adaptation.

3 When accumulated over time, such effects can have a very large impact on welfare, see Burke et al. (2015).

4 Articles 191 and 192(1) TFEU.

5 Articles 5, 6 and 7.

Climate-ADAPT platform, and applied to local situations (top-down). As adaptation interventions are still about learning by doing, there is also an interest in sharing local experiences at the European level in order to accelerate the learning process (bottom-up).

The EU can also use its administrative capacity to develop standardised methods that can be applied by local or regional governments to report damages, carry out cost-benefit analyses of interventions and *ex post* evaluations of policies, and to track adaptation progress. This would facilitate decision-making and enable cross-country comparisons for research and policy purposes.

Emergency response to major climate-related disasters is a very practical example of how scale can make a difference. Adaptation policies in the strict sense are preventive, but not all damages can be avoided, especially those of severe fast-onset events, so adaptation to climate change must entail strengthened capacities to respond to more frequent and severe natural calamities. National response capacities can easily be overwhelmed by large-scale floods or forest fires. Since time is often of the essence, pooling resources for fast and decisive interventions can avoid substantial damages and loss of life. The EU Civil Protection Mechanism was established for this purpose, as well as to assist countries before and after disasters strike.

Adapting to climate change requires cooperation across jurisdictions when effects are not limited to a single area. River management for irrigation, navigation and energy purposes during droughts is best done in cooperation with countries upstream and downstream, as is the management of floods. Vulnerable ecosystems do not stop at borders, and neither do infectious diseases or invasive species.

Finally, some climate impacts are specifically relevant for EU policymakers as they affect the functioning of the single market or the EU budget, for example, when essential transport infrastructure is damaged (ports, bridges, etc.) or supply chains are disrupted. Moreover, different policy fields already within the EU's competences can play an essential role in supporting climate change adaptation, such as regional and agricultural policy, insurance and financial regulations, and even fiscal rules.

Proposals for stronger adaptation governance

EU action on adaptation has already advanced greatly since the first strategy was adopted in 2013, but more must still be done to prepare Europe for a warmer climate. There is a notable absence of binding, precise and measurable targets for both EU-level adaptation policies and for the framework governing national and subnational adaptation action. Adaptation continues to be a secondary priority for some governments according to observers, resulting in weak subnational policy action (European Commission, 2021a). There is also a lack of public and private sector investment in concrete adaptation solutions. Targets are needed to accelerate adaptation efforts by reluctant governments, according to criticism by civil society organisations, which point to similar demands by the European Parliament and the Commission's own assessment that progress is too slow (EEB, 2021). It is also not clear how the EU will address the pressure that climate change could put on existing fault lines between northern and southern/south-eastern member states, as the Commission's strategy rests mainly on developing guidance, standards and best practices, supporting (sub)national policy development, and integrating adaptation into a few regulations. In the following, we therefore set out some ideas to strengthen European adaptation governance.

A multi-layered governance framework to structure cooperation

Under the EU Energy Union governance regulation (Regulation (EU) 2018/1999), EU countries are required every decade to submit ten-year integrated national energy and climate plans (NECPs), which should be updated halfway through each cycle. The regulation also requires progress reports from member states every two years. The European Commission assesses progress and issues recommendations. The regulation contains a requirement to describe adaptation goals, but only insofar as they apply to emission reduction commitments. Adaptation therefore seems to play only a secondary role in the NECPs.

The European Climate Law requires EU countries to adopt and implement national adaptation strategies and plans. These must be regularly updated and communicated every two years in reports dedicated to national adaptation actions. Every five years starting in 2023, the European Commission will then assess collective progress by member states.

Looking at the legal requirements, one can conclude that member states are not asked in any of these reports to set binding, measurable adaptation targets for which they can be held accountable.

A lack of action can also arise because governments at every level must play a role in adaptation. Without a clear division of tasks, governments can avoid responsibility, shifting the burden onto each other. This also happens when local governments are expected to implement adaptation plans without adequate funding, for example,

local building moratoriums that require compensation to be paid to landowners. Matters are made even more complex as horizontal cooperation across neighbouring jurisdictions is often needed to ensure consistency and to avoid maladaptation (for example, when building flood defences creates problems further downstream). Finally, better top-down and bottom-up information flows are needed to make sure that scientific knowledge can be used at local levels, while local experiences can feed back to policymakers higher up or can be shared with other jurisdictions.

A governance framework for adaptation action based on three levels could clarify tasks. It could facilitate and structure cooperation and the exchange of information between jurisdictions and different governance levels and allow for the introduction of binding, verifiable targets.

At the highest level, the European Commission and other relevant EU bodies such as the European Environment Agency should remain mostly responsible for helping to generate, collect and spread scientific knowledge (such as satellite imagery and model simulations). They should provide a platform through which national and subnational governments can share ideas, experiences and adaptation practises in a structured way, so that, for example, local governments can find out easily what similar places (in terms of urbanisation, climate, vegetation, geography, etc.) are doing. The sharing of information and its use for governance purposes would benefit from uniform measurement of damages and risks, and from methods to perform cost-benefit analyses, *ex post* evaluations and assessments of progress. These should therefore also be developed at the European level, preferably in consultation with member states. Disclosure requirements on governments could then be put into place accordingly. The EU should also expand its emergency intervention capabilities and continue to mainstream adaptation into other policy areas.

As the guardian of the general adaptation governance framework, the European Commission should engage with member states, using its expertise to help them establish binding ten-year national adaptation plans with clear and public targets, which are consistent with the plans of neighbouring countries. This would be a step further than what is demanded by European Climate Law.[6]

The Commission has a coordinating and informing role: It is up to countries themselves to decide on the level of ambition and to propose overall targets, such as the degree of private insurance coverage, depending on how they see priorities. This should not mean, however, that no incentives should be put in place to push for more ambition. The Commission should also be allowed to require the inclusion of strategic interventions that have EU-wide relevance, for example, for the protection of key infrastructure.

National adaptation plans should serve as a guide for local government action and should set the ambition level. Detailed knowledge of local circumstances and national/European expertise needs to be combined to formulate very concrete interventions, while avoiding maladaptation because of an excessive focus on single impacts.

This framework is meant to be flexible and cooperative rather than overly rigid and hierarchical. However, agreed adaptation plans should be formal, and we propose a link to an insurance instrument.

An EU insurance and solidarity fund to incentivise and help member states

The framework from the previous section would impose binding targets to enhance accountability but would allow member states to choose their own ambition levels. To push lagging member states and regions towards more decisive action than seen at present, we propose an incentive scheme, acknowledging that EU countries are unlikely to be willing to accept large and structural fiscal transfers to compensate for long-term climate-induced damages.

To reduce the threat of a climate divide, the fiscal risk of damages after climate-related disasters could be shared. The European Commission estimates that without adaptation, annual damages in Europe from floods alone could reach up to €144 billion by 2100 (from €9.2 billion today), even with only 2°C of warming (Feyen et al., 2020). Damages will be partly covered by private insurance, but it often falls to governments (sometimes by law) to contribute significantly to compensation spending, even in countries with extensive and mandatory coverage.

Expected government payments vastly exceed the capacity of the current European Solidarity Fund for post-disaster assistance, some €500 million in grants per year (2011 prices). It can therefore only compensate a small share of total non-insurable damages. Significantly enlarging the fund's capacity to cover an agreed set of public costs can soften the fiscal blow for affected countries. EU member states are all exposed to various extreme

6 We do not propose to integrate them into NECPs because adaptation is not secondary to mitigation but should be consistent with it. We therefore think the revising and reporting schedule (five- and two-yearly) should be aligned with that of the NECPs, while the Commission should publish individual progress assessments every five years, rather than the current EU-wide assessment mandated by the regulations.

impacts, creating a rationale for all to be insured against catastrophic impacts. The returns on repairing infrastructure and providing emergency housing and aid are also much more obvious to voters than those on climate adaptation investments, even if the latter may in fact be quite significant (Global Commission on Adaptation, 2019). Committing more funds here might therefore be much more feasible politically.

The fund should be financed by national contributions, based on a conditional mechanism which incentivises adaptation investments *ex ante*. Countries that do not implement adaptation measures would pay more into the fund than countries that implement strong adaptation measures. When a disaster occurs, the affected member state can be reimbursed.

An exact recommendation for the fund's capacity is hard to give as it would depend on the agreed scope of eligible damages, but one might imagine an annual capacity of several billion euros by 2030, growing with nominal GDP (which means more exposed value). However, it does not need to be large enough to compensate for all damages in particularly bad years, and a certain percentage of self-payment should always be required.

If compensated damages in a certain year (as legally defined) exceed the fund's basic capacity, the EU could issue bonds to cater to such systemic shocks. The interest and repayment burden can be distributed between member states in the same way as the financing of the fund itself.

The advantage of combining a fund with a borrowing capacity for systemic shocks is that markets will only be called upon for insurance against massive climate risks. If climate risks become more frequent, the fund will become increasingly important and intertemporal insurance will become less important relative to constant payments from the fund for incurred and repeated damages.

The mechanism to divide contributions to the fund and interest payments among member states serves the second purpose of this proposal to incentivise countries to invest in climate change adaptation, by making contributions depend on the achievement of targets as set out in the proposed national plans.

Adaptation plans must contain binding and verifiable targets. These could be proposed by countries at the beginning of a ten-year cycle for five-year periods. The Commission could then be asked to give an objective assessment of their level of ambition, after which the plan is approved by the Council. Depending on whether the targets achieve a certain reference level, to be agreed in advance (for example in terms of estimated damages prevented), the Council decision could also tie reductions of a country's contributions to the achievement of the targets. National contributions would initially include a risk premium to reflect countries' actual risk, which would decline as countries take steps to reduce climate vulnerability to a feasible extent. The system could thus evolve from risk-driven to solidarity-driven (e.g. based on GDP).

Financial resources for disadvantaged regions and key interventions

The proposals presented above may still not be sufficient to ensure adequate adaptation action in the most disadvantaged regions, particularly those in the south, which will suffer disproportionately from climate change. Yet, as explained above, political support for sharing the investment burden for *ex ante* adaptation seems unlikely.

Estimated annual investment needs in Europe are anywhere from €35 billion to more than €500 billion (EIB, 2021), whereas numbers from Olesen et al. (2017) suggest that from 2014 to 2020, only between €14 billion and €62 billion in total was allocated to adaptation through the EU's regional and agricultural policies. EU funding alone clearly cannot and should not suffice to make Europe resilient to global warming, and member states and the private sector both have large roles to play. However, the EU could use its regional and agricultural funds to target adaptation more strongly in the next budgetary cycle.

One could, for example, decide to increase the minimal share of climate-related spending, and within that category decide to focus mostly on mitigation in north-eastern regions, while focussing on adaptation in southern regions, including in the Balkans. This would not undermine economic convergence or rural income support, given the supposedly high returns on investment in adaptation and the vulnerability of agriculture. Communicating the two numbers separately would also increase transparency, whereas today it is rather difficult to say exactly how much is dedicated to adaptation. Better still would of course be to pursue the maximum synergies between mitigation and adaptation, for example, through nature-based adaptation solutions.

Another solution could be to propose an EU financial instrument for the protection of a limited list of infrastructure, supply chains, ecosystems and perhaps heritage sites that are of EU-wide relevance, such as seaports, energy linkages or corridors for migrating species. The Commission would then be able to require the inclusion of these elements in national adaptation plans and would provide the necessary funding in return.

Conclusion

As the effects of climate change are becoming more apparent, it is already clear that they can be severe, depending on how far temperatures rise, and that not all EU countries will be affected to the same degree. The drought that affected Italy in the summer of 2022 is an ominous example of what could be in store for most countries south of the Alps. Impacts will also differ between economic sectors and social groups, and they will be counted in percentages of GDP and lives lost.

Adapting to climate change is mostly a matter of regional and local action, but there are several reasons why the EU should also play a role. These involve scale advantages, territorial spillovers and impacts that relate specifically to the EU's other competences, such as ensuring the functioning of the single market. This is reflected in the two adaptation strategies that the European Commission has adopted so far, and in its efforts to create an EU disaster-response capacity.

These strategies have driven progress at the EU level. However, a lack of knowledge, awareness, political priority and funding among some (sub)national policymakers continues to lead to weak policy implementation. The current EU strategy does not address this sufficiently, as binding, measurable targets are absent and not demanded from member states. More cooperation among governments is needed to strengthen policymaking and define tasks. The threat of climate-driven divergence between member states remains unaddressed.

We make three suggestions in response to these problems: First, create a three-layered governance framework based on intensive cooperation and information-sharing to establish binding adaptation plans; second, set up EU-level insurance against damages from climate change, with national contributions tied to the achievement of self-chosen targets in adaptation plans; third, increase *ex ante* adaptation funding by targeting more spending under EU regional and agricultural policies specifically at adaptation in the most vulnerable regions, and by setting up an EU financial instrument for the protection of infrastructure and value chains that are of EU-wide relevance.

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DOI: 10.1007/s10272-022-1073-2

Intereconomics, 2022, 57(5), 322-328

JEL: E58

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The European Central Bank's Ethical Rules

Incidents at the US Federal Reserve Raise Questions About the Rules of Conduct for the European Central Bank's Governing Council

The study analyses the private securities transactions at the US Federal Reserve that have been made public since late 2021 and are worthy of criticism. It is shown by way of example that under the current applicable rules of conduct for the European Central Bank's Governing Council members, such questionable transactions would neither be reported nor prohibited. The important goal of avoiding even the appearance of personal insider benefits and interest-driven monetary policy decisions is thus not achieved. In this respect, the rules of conduct for the members of the European Central Bank's Governing Council require urgent revision even after they were recently adapted.

Rules of conduct are a necessary, confidence-building substitute conscience

Trust is a necessary precondition for state money to be able to fulfil its three functions without restriction: unit of account, means of payment and store of value. Central banks are special institutions that produce this commodity. For some central banks, the postulate of independence applies. Especially in this constellation, democratic control and supervision of a central bank's functionaries is lacking. The integrity of this group is therefore an important prerequisite for money holders to have and retain confidence in the currency. That is why a codified set of rules, which provides guidelines on transparency and the behaviour of decision-makers, is indispensable as a kind of substitute conscience. Even the appearance of a breach of trust should be avoided.

In concrete terms, there are two potential interdependencies that are not mutually exclusive:

- Individual securities investments or transactions influence the decisions of the governors and endanger the independence of their actions – possibly with high economic damage.
- The use of insider knowledge enables individual profits from investments or transactions. Initially, no economic damage is caused, but there is an ethically and politically unacceptable problem of justice and distribution.

Questionable securities transactions by some Fed members

Four members of the US Federal Reserve (Fed) have come under fire for questionable financial transactions surrounding key monetary policy decisions during the 2020 pandemic. A brief overview shows examples of the investments and securities transactions that came under criticism.[1]

Fed Chair Jerome Powell

Jerome Powell was confirmed for a second term as Fed chair in March 2022.[2] His private securities portfolio shows that he had long been exposed to municipal bonds in amounts ranging from $1.165 to $5.4 million.[3] He benefited from price increases related to the Fed's decision in April 2020 to purchase short-dated municipal bonds

Open Access funding provided by ZBW – Leibniz Information Centre for Economics.

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1 For more details on these transactions, see Hansen and Meyer (2022).
2 The financial disclosures of Jerome Powell are available at the U.S. Office of Government Ethics (2021a). Further details on these offer Kuttner (2021), Wiebe (2021) and Dörner (2021).
3 The U.S. Office of Government Ethics' data collection only captures value ranges.

up to half a trillion US dollars. On 1 October 2020, Powell sold between $1 and $5 million worth of shares in his Vanguard Total Stock Market Index Fund – in time for the Dow Jones to fall by about 6% in October. On that day, according to meeting minutes, he was in contact with Treasury Secretary Steven Mnuchin four times. This may also be connected to the Trump administration's rejection of a new stimulus package. The only stipulation of the behavioural guidelines was that a sale should not have been made between 5 and 16 September (financial trading blackout period).[4] The transaction took place after the Federal Open Market Committee (FOMC) meeting on 15-16 September, but before the minutes of that meeting were published on 7 October.[5] It is noteworthy that the trading blackout period does not include this stretch of time, as information advantages between the meeting and the release of the minutes are likely to be inherent.[6] The minutes identified several downside risks as possible threats to economic recovery.

What is more, a financial advisor working on behalf of Jerome Powell's family trust conducted five transactions in December 2019 during the Fed's trading blackout period (Federal Reserve Bank, 2022e). The advisor later acknowledged that the timing of these trades was an "oversight" (Siegel, 2022; Smialek, 2022c).

Former Vice Chair Richard Clarida

A second case concerns alleged portfolio restructurings by then Fed Vice President Richard Clarida, who on 27 February 2020 made a shift from bond funds to equity funds/ETFs in the range of $1 to $5 million, as shown in what he declared to the US Office of Government Ethics in May 2021 as complete disclosures for the 2020 calendar year.[7] The date of this reallocation is one day before Powell signalled possible Fed intervention should the pandemic situation worsen. According to the Fed, the transactions had been planned for the long term and had also been approved by the Ethics Committee.

However, this account of a portfolio reallocation appears questionable after Clarida subsequently supplemented his declaration on 16 December 2021 in order "to correct inadvertent errors in the financial disclosure report I signed on May 14, 2021" (U.S. Office of Government Ethics, 2021c). Among other things, that supplement shows that on 24 February 2020, Clarida first sold shares in the same equity exchange-traded fund (ETF) in which he invested three days later – each in the range of $1 to $5 million.[8] Were these components of a long-term investment strategy?[9] The process of a relatively late submission of a late disclosure seems remarkable in itself, because apparently no one but Clarida himself had performed a reconciliation between the approved, executed and then disclosed transactions. Clarida finally retired from his position at the Fed in mid-January 2021, two weeks before the official end of his term of service.

In the three days between the sale and repurchase by Clarida, US securities prices fell. After Clarida's buyback on 27 February and Powell's announcement of possible Fed rescue measures on 28 February, the S&P 500 Index initially continued to fall, but the buy level was reached again by mid-May, and then prices continued to rise – especially since the Fed followed up Powell's signals with extensive monetary policy action. However, the decisive factor for an evaluation of such transactions should not be their possible profits. Rather, the transactions themselves already give reason to cast doubt on the independence and integrity of the Fed.

Robert Kaplan, former President of the Dallas Fed

In 2020, Robert Kaplan, former manager of Goldman Sachs, held a securities portfolio of 17 stocks, two equity ETFs on the S&P 500 and three bond funds/ETFs. In addition, there were seven alternative investments, including an investment in the Kansas City Royals baseball team. His Financial Disclosure Form 2020 shows 26 transactions, including 21 combined purchases/sales of

4 The Open Market Committee's blackout period begins on the second Saturday before an FOMC meeting and ends at the close of the last day of the meeting. According to a voluntary code in force until April 2022, no securities transactions were allowed during this period (Federal Reserve Bank, 2017, Rule No. 3). As of May 2022, the blackout period was extended by one day. It now ends at the end of the day following the last day of the meeting (Federal Reserve Bank, 2022b, Attachment 4).

5 The associated meeting minutes are published three weeks after each FOMC meeting. The information contained in the minutes can go beyond the Fed statement published on the last day of the meeting and the subsequent press conference.

6 This is evidenced, for example, by the significant price losses on the stock markets on 5 January 2022, which were triggered by the publication of the December FOMC meeting minutes. The minutes indicated that the Fed could tighten its monetary policy much faster than previously assumed (Frühauf and Petersdorff, 2022). Rosa (2013) presents a detailed analysis of the effect of the FOMC minutes on the financial markets.

7 The financial disclosures of Richard Clarida are available at the U.S. Office of Government Ethics (2021b, 2021c). Further details on these present Petersdorff (2021a), Smialek (2022a-b) and Torres (2022, 2021).

8 This involved the iShares Edge MSCI Min Vol USA ETF (USMV).

9 A representative of Clarida stated in July 2022, that Clarida "sold out of the stock fund to create liquidity" and later "decided that it would be better to return to the stock fund" (Smialek, 2022c).

one security each during the year.[10] The latter basically characterises a speculative engagement. Kaplan was involved in monetary policy decisions in the FOMC at the time. He commented on his resignation announcement of 27 September 2020: "Unfortunately, the recent focus on my financial disclosure risks becoming a distraction to the Federal Reserve's execution of that vital work" (Marte et al., 2021).

Eric Rosengren, former President of the Boston Fed

As a member of the FOMC, Eric Rosengren could attend its meetings, which made him privy to inside information. His annual financial disclosure for 2020 shows holdings in four real estate investment trusts (REITs), an ETF S&P 500 Technology Stocks and six stocks.[11] What is striking is a strong, in part exceedingly short-term shifting with a total of 68 transactions. At least seven securities were bought and sold within a year, six within three months and three after exactly one month. Thus, the 30-day minimum holding period was just met (Federal Reserve Bank, 2017, rule No. 3). This shows a quite speculative character. The sales of 17 and 20 September 2020 shortly after the trading blackout period of the FOMC meeting and before publication of the related meeting minutes appear particularly problematic. At the same time, he traded all four REITs in 2020. The Fed purchased $40 billion per month in this class of securities. In addition, 13 transactions took place between March and July, i.e. shortly after an ethics department's email request to please refrain from securities trading in the near future.

Comparative overview of central compliance rules on securities transactions

The following is a comparative review of the rules of conduct on securities transactions by decision-makers at the European Central Bank (ECB), the German Bundesbank and the Federal Reserve System.

The ECB and the Deutsche Bundesbank

The ECB's compliance rules are laid down centrally in two guidelines as well as in the Ethics Framework and the Code of Conduct for Senior Officials (European Central Bank, 2015a-d, 2019, 2020). In November 2021, the ECB revised these guidelines (European Central Bank, 2021b-c). Furthermore, there are additional requirements by the national central banks.[12] As a result of the requirement to implement the revised guidelines, harmonised minimum standards with partly stricter national regulations will apply in the future. The principle applies that high-ranking functionaries may not use insider information for private financial transactions. Furthermore, these transactions should be "non-speculative, restrained and in reasonable proportion" (European Central Bank, 2020, 31). The formulation of a medium- to long-term investment horizon (Article 10 Guideline (EU) 2021/2253 of the ECB) corresponds to this. The investments in shares and bonds as well as the investments derived from them of financial corporations with a place of business in the EU are prohibited. Short-term transactions of the same security that was bought or sold in the previous month must be approved. Transactions in government bonds of euro area member states are also subject to approval. There are special requirements for other investments such as gold and foreign exchange.[13] The bonds recently issued by the EU within the framework of the Next Generation EU recovery fund and the solidarity package are not explicitly covered. All other funds and real estate purchases are exempt from approval. In addition, all restrictions are lifted if an asset management company is granted full power of disposal. In general, private financial transactions of more than €10,000 in a calendar month must be reported to the Compliance and Governance Office within 30 calendar days.

The German Bundesbank sets more restrictive investment limits. Whereas at the ECB there is no trading blackout period at all according to publicly available rules, securities transactions with shares, bonds, money market instruments and derivatives are "to be refrained from" for the members of the Executive Board of the Bundesbank "in the period of seven days before and on the day of the meeting of the ECB Governing Council".[14] In addition, there is a holding period for securities of at least six months.[15]

Institutionally, the ECB has set up an ethics committee consisting of three external members. Its members are appointed by the Governing Council.[16] In addition, there

10 The financial disclosures of Robert Kaplan were published by the financial news website WallStreetOnParade.com (Kaplan, 2021). Petersdorff (2021b-c) offers further details.

11 See the Confidential Financial Disclosure Report 2020 by Eric S. Rosengren (2021), which was made available to the authors on request by the Boston Fed. For further details, see Torres et al. (2021) and Edelman (2021).

12 For example, Deutsche Bundesbank (2016).

13 For individual forms of investment, see also European Central Bank (2021c), Article 11.

14 Own translation of the authors, the German original version can be found at Deutsche Bundesbank (2016), No. 8 (4).

15 In contrast, European Central Bank (2021c) in Article 11 paragraph 2c) only generally provides for rules that shall "restrict short-term trading" and are to be implemented in the internal rules of the Eurosystem central banks.

16 Similarly, the Fed's inspector general is appointed and removed by the Fed itself, which has recently led to calls for more independent investigations, see Torres (2022) and Siegel (2022).

is an internal Compliance and Governance Office. With the amendment of the Ethics Framework 2020, an internal reporting platform ("whistleblowing tool") was also established. The counterpart to the Fed's Financial Disclosure Reports are the ECB's Declarations of Interests pursuant to Article 10 of the Code of Conduct for Senior Officials. According to this, an annual declaration must be made "about the member's previous occupational activity, private activities, official mandates and financial interests" (European Central Bank, 2019, Article 10.1).[17]

As an innovation, the ECB guideline on the ethics framework, which was reformed at the end of 2021, specifies for Eurosystem central banks that "their members of staff … who meet with external parties … (a) maintain neutrality …; (b) observe a seven-day quiet period prior to any monetary policy meeting …; (c) keep basic records of the meetings; and (d) avoid any conduct that could be perceived as granting external parties any advantages" (European Central Bank, 2021c, Article 5). As early as 2020, criticism was levelled at the communication practices of ECB chief economist Philip Lane, as he had made bilateral phone calls to a few financial market participants in the hours immediately after ECB Governing Council meetings on the latest ECB decisions (Fairless, 2020). As a result of the criticism, the ECB announced its intention to reconsider this specific method of communication (Arnold, 2021a). In September 2021, the Financial Times reported that Philip Lane had revealed a hitherto unpublished ECB inflation forecast at a meeting with a few economists from German banks, from which conclusions could be drawn about the future development of interest rates (Arnold, 2021b). The Financial Times report was described by the ECB as inaccurate, but it led to further criticism of the lack of transparency of such meetings between ECB officials and third parties (Canepa, 2021).

The Federal Reserve System

Members of the Board of Governors of the Federal Reserve System and the presidents of the Federal Reserve Banks are subject to the rules of the Voluntary Guide to Conduct and, in addition, to other requirements of the regional Feds.[18] As a result of the publicly discussed securities transactions by Fed members, it was announced in October 2021 that the investment guidelines would be revised and made considerably more restrictive.[19] The rule changes were adopted in February 2022 and are intended to strengthen confidence in the impartiality and integrity of the FOMC by preventing even the appearance of conflicts of interest (Federal Reserve Bank, 2022c-d; Smialek and Ngo, 2022).[20] Among other things, the purchase of individual stocks or sector funds as well as individual bonds, cryptocurrencies, commodities, foreign currencies and derivatives was prohibited (Federal Reserve Bank, 2022d, Section 3 and 4). For the purpose of approval, transactions must be announced 45 days in advance and the minimum holding period increases from one month to one year (Federal Reserve Bank, 2022d, Section 4 b-c). Short-term speculative trading is thus prohibited. The blackout period for securities transactions has been extended by one day following each FOMC meeting.[21] Likewise, trading is generally not to be permitted during financial market stress periods (Federal Reserve Bank, 2022d, Section 4 d).

As a first consequence of the new investment guidelines, Jerome Powell had declared in December 2021 that, in the event of his reappointment as Fed Chair, he would sell his holdings of municipal bonds as soon as possible, but within 90 days at the latest, and ensure that all proceeds are invested in conflict-free assets (Powell, 2021; U.S. Office of Government Ethics, 2022a-b).

In July 2022, a report by the Fed's inspector general found that Powell's and Clarida's "trading activities did not violate the laws, rules, regulations, or policies as investigated", although it noted evidence of financial activity which was not allowed or disclosed (Federal Reserve Bank, 2022e). The report drew some criticism from Fed experts and lawmakers stating that it restored little confidence that officials might be penalised in case of financial wrongdoings (Siegel, 2022).

Gaps in the ECB's compliance requirements

Based on the ECB's Declarations of Interests, the deficiencies that continue to exist are highlighted by means of a concrete example. This will be followed by a generalised list of structural deficits in the ECB's investment guidelines.

Declarations of Interests – A stocktaking of the ECB's Governing Council members

A comparison of the self-declarations of financial circumstances for 2020 and 2021 (European Central Bank, 2021a, 2022) reveals that ECB President Christine Lagarde's securities portfolio consisted unchanged of the

17 These statements are published by the ECB. See https://www.ecb.europa.eu/ecb/access_to_documents/document/declarations/html/index.de.html.

18 The rules are laid down in Federal Reserve Bank (2017, 2022a). For further details on these, see Hansen and Meyer (2022).

19 For more information on the announcement of the Federal Reserve Bank (2021), see Börsen-Zeitung (2021), Handelsblatt (2021) and Petersdorff (2021d).

20 The new rules apply from May and July 2022 respectively.

21 As is specified in Federal Reserve Bank (2022d), Section 4 e in conjunction with Federal Reserve Bank (2022b), Attachment 4.

same two funds. In contrast, ECB Executive Board member Isabel Schnabel reduced the number of positions in her portfolio from 44 to 11. In the process, she sold all 33 individual shares she had previously held. As of 31 December 2021, she still held ten ETFs and one actively managed fund.

The current ECB disclosures also reveal a relatively strong regional portfolio orientation among other Council members.[22] For example, the Estonian central bank president, Madis Müller, holds shares in three companies based in his home country. The head of the Maltese central bank, Edward Scicluna, holds shares in some non-listed Maltese companies. Pierre Wunsch, president of the Belgian central bank, holds shares in two Belgian start-up companies. On the other hand, there are some Council members who neither have large cash holdings in banks supervised by the Single Supervisory Mechanism (SSM) nor any shares, bonds or funds, such as Frank Elderson (ECB Executive Board), Gabriel Makhlouf (Central Bank of Ireland) or Bundesbank President Joachim Nagel, whose predecessor Jens Weidmann held two ETFs. The self-declarations of another group of members only show cash holdings above €100,000 at at least one bank under SSM supervision, including ECB chief economist Philip Lane, Fabio Panetta (ECB Executive Board) and Robert Holzmann (Austrian National Bank). A special case is François Villeroy de Galhau (Banque de France), whose securities account contains only shares of the ceramics supplier Villeroy & Boch. He comes from a family of industrialists who are co-owners of the traditional company.

A hypothetical case comparison of the Fed's and ECB's disclosure rules

In the public perception, former Fed Vice President Richard Clarida's investment decisions are a case of misconduct. His – subsequently corrected – transactions show a total of eight securities transactions for the year 2020 (see Table 1).

As a member of the ECB's Governing Council, Clarida's problematic transactions would not have been disclosed to the public. In particular, the portfolio restructurings (items 4-6) of 27 February 2020, in which a shift from bond funds to equity funds/ETFs in the amount of $1 to $5 million took place – one day before the Fed informed about possible interventions – would not have been noticed. The same applies to the sale of the iShares Edge MSCI Min Vol USA ETF (item 2) on 24 February, which was repurchased three days later in the same order of magnitude (item 6) and almost two weeks later in a smaller amount (item 8) – supposedly for his wife. In the ECB's Declarations of Interests, Clarida would only have had to provide information on the ownership of a corresponding security, in which the iShares Edge MSCI Min Vol USA ETF would have been listed unchanged year-on-year. Neither the amount of the holding nor the transaction dates and volumes would have been disclosed.

Table 1
Former Fed Vice Chair Richard Clarida's disclosed securities transactions, 2020

	Date	Security	Transactions	Amount (USD)
(1)	24 February	Schwab Strategic 1000 ETF	Sale	250,000-500,000 (correction)
(2)	24 February	iShares Edge MSCI Min Vol USA ETF	Sale	1,000,000-5,000,000 (correction)
(3)	24 February	iShares Core High Dividend ETF	Sale	100,000-250,000 (correction)
(4)	27 February	Pimco Income Fund Inst. Class Shares	Sale	1,000,001-5,000,000
(5)	27 February	Pimco StocksPLUS Fund Inst. Class Shares	Purchase	1,000,001-5,000,000
(6)	27 February	iShares Edge MSCI Min Vol USA ETF	Purchase	1,000,001-5,000,000
(7)	8 March	Schwab 1000 ETF	Sale	500,001-1,000,000
(8)	8 March	iShares Edge MSCI Min Vol USA ETF	Purchase	250,001-500,000

Source: U.S. Office of Government Ethics (2021b, 2021c).

Structural deficits of the ECB investment guidelines

Even apart from the lack of a concrete minimum holding period and a trading blackout period, the compliance rules for investments by ECB Council members are considerably softer than those of the Fed. For example, the self-declarations of assets in the so-called Declarations of Interests only include the type of investments (with a security identification number, if applicable) held on a specific date at the end of each year (European Central Bank, 2021a, 2022). In contrast, the annual report of the US Office of Government Ethics records all investments with their investment value and the income accrued from them on an annual reporting date.

In addition, all transactions carried out during the year are listed there. Purchases and sales are listed by value and by date. The latter information is important in order to be able to trace any temporal connections of the transactions with market-relevant decisions of the central bankers. Yet at the ECB, transactions carried out during the course of the year are only visible with regard to the portfolio composition on the reporting date at the end of the year. In

22 Further details offer Ettel and Zschäpitz (2022).

other words, purchases and sales during the year cannot be traced. Further information such as transaction dates and volumes remain hidden, especially since the form for the information explicitly states: "Amount of money not needed" (European Central Bank, 2021a, 2022).

Proposed changes to the ECB's rules of conduct

In order to avoid even the appearance of personal insider benefits and interest-driven monetary policy decisions, the ECB should revise its compliance rules.[23] In addition to information on the value of financial assets, the so-called Declarations of Interests should be supplemented by information on the annual transactions by type, value and date. All transactions should be submitted to the Compliance and Governance Office for approval. Financial trading blackout periods, as indicated by the Bundesbank for a period of seven days before and on the day of the Governing Council meeting, would make sense – possibly even to be extended until the publication of a meeting protocol. Another confidence-building measure would be a minimum holding period for securities, e.g. similar to the six months at the Bundesbank or now 12 months at the Fed. The ethics committee should also be able to stipulate the exclusion of trading in times of capital market tensions and in anticipation of special decisions.

Conclusions

Research by journalists in autumn 2021 revealed securities dealings by some high-ranking members of the Federal Reserve Bank, which led to criticism, discussions and ultimately to a tightening of the Fed's compliance rules. Even after the adoption of two new ECB guidelines at the end of 2021, ECB Governing Council members are subject to much softer investment rules. Nonetheless, the ECB leadership assesses its ethical standards as "the basis for public trust and ultimately for the ECB's credibility" (European Central Bank, 2021d).[24] The authors therefore suggest a number of additional rule commitments that the ECB could implement. These include a minimum holding period for securities, a trading blackout period before and on the day of the Governing Council meeting, value-based information on financial assets, information on annual transactions by type, value and date, and a general authorisation requirement for all securities transactions.

23 The Governing Council has to review these at least every three years, see European Central Bank (2021c), Article 15 paragraph 2. See also Meyer and Hansen (2021).

24 This is a quote from Christine Lagarde.

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DOI: 10.1007/s10272-022-1072-3

Intereconomics, 2022, 57(5), 330-336

JEL: I12, I18

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Vaccination Gap, Vaccination Fraud and Inefficient Testing

Lessons From the Coronavirus Pandemic

A number of shortcomings in Germany's efforts to contain the spread of the coronavirus, including fraudulent testing, vaccination fraud and insufficient testing capacity have been identified and need to be remedied before another wave or worse, another pandemic. This paper examines the failures of the deterrence instruments and proposes solutions to address them.

More than two years ago, a pandemic erupted that is not yet over. After its first detection in Wuhan, China, a succession of new mutations of the coronavirus, ranging from the Alpha, to the Delta, to the Omicron variant, has kept the world in suspense.

After the development of effective vaccines, their large-scale deployment promised a speedy containment of the pandemic. However, many people have refused to be vaccinated while the rise of the more contagious Omicron variant accelerated the spread of infections. At the same time, in Germany we have seen that fraudulent testing, vaccination fraud and insufficient testing capacity, aggravated by poor testing methods, impaired the containment of the pandemic.

This paper discusses some failures of the containment strategy in Germany as well as possible solutions, inspired by economic analysis.

Open Access funding provided by ZBW – Leibniz Information Centre for Economics.

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Vaccination gap

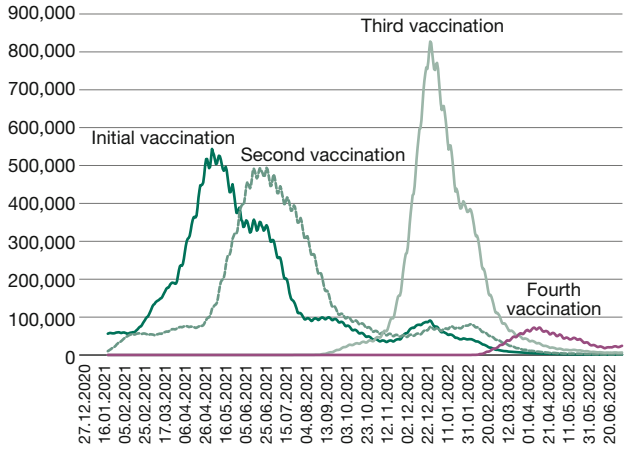
One of the most pressing issues to address in the containment of the virus is the vaccination gap. As too few people are vaccinated (see Figure 1), the spread of the virus is still out of control, leading to more severe infections and overcrowded hospitals.

People who are not vaccinated are more likely to be infected and will therefore have four kinds of side effects or externalities for others: they are more likely to spread the virus, they contribute to the production of new mutations of the virus, they impose a financial burden upon the health insurance system and they crowd out the treatment of patients with other health issues.

There are multiple reasons why people choose not to be vaccinated. One reason is the classical "free-rider problem" that plagues all vaccination programmes. A rational person may choose not to be vaccinated, because if many others are vaccinated, he or she shares the benefit of vaccinations without having the risk of potential side effects, no matter how small. If free riding is a frequent response and the health risk and its repercussions on the economy are as serious as they are in this pandemic, the reasonable public health response is to make vaccinations mandatory.

If one mandates vaccinations, one may use either a "carrot approach" or a "stick approach". The carrot approach offers financial or other rewards for those who consent to be vaccinated, while the stick approach penalises those who refuse vaccination. However, the carrot approach may induce speculation for ever higher rewards and may crowd out those who are otherwise

Figure 1
Vaccinations per day in Germany
30 days moving average



Source: RKI (2022), own calculations.

willing to be voluntarily vaccinated without financial reward.

A simple scheme to implement mandatory vaccinations could be as follows: Every adult resident is charged a lump-sum coronavirus tax that is billed in the annual income tax statement. That tax is refunded instantly when taxpayers file their income tax returns and supply proof of vaccination with their income tax statement. The net tax revenue can be used to subsidise the health insurance system or hospitals that were at the forefront of treating patients with COVID-19 infections. The appeal of this scheme is that one does not need to monitor peoples' vaccination status because that information is automatically forthcoming. This tax scheme could also be used to generate an anonymised data base on vaccinations that could automatically be deleted when the pandemic is over.

This tax scheme will most likely be effective because people tend to do everything imaginable to reduce their taxes. Distributing the net tax revenue to health insurers or hospitals could contribute to internalising the financial burden that the unvaccinated impose on others by overcrowding hospitals and taking advantage of the solidarity principle built into our health care systems.

Fraudulent testing and counterfeit vaccination records in Germany

Another problem that needs to be addressed concerns the widespread fraudulent testing and counterfeiting of vaccination certificates.

Coronavirus tests

In some countries rapid antigen coronavirus tests are provided free of charge on a large scale by testing centres, funded with public money. In Germany, these tests are widely used because a negative test result has been a prerequisite for entering shops or attending public events.[1] The operators of these test centres do not have to offer proof that they actually provided a test.[2]

This method of funding COVID-19 tests encourages fraudulent behaviour on an alarming scale and not only wastes taxpayer money, but also distorts the detection of infections, which is the *ultima ratio* for providing tests free of charge.

Insufficient or inadequate control mechanisms encourage fraud at testing centres (Beck et al., 2022).[3] The lack of control provides incentives for billing tests that were actually never performed, and test centres have no incentive to detect an infection – after all, that is what this mandatory testing is about. Moreover, not all test takers are interested in a correct test, but instead in a clean bill of health (e.g. to attend events). This favours sloppy testing and potential fraud even further, as the tested person is no longer a control authority. On top of that, the current practice induces the employment of unskilled staff and maximises the testing centre's revenue rather than test quality.[4]

A simple proposal to stop fraud at testing centres is to pay only positive tests instead of paying every test. If a rapid test shows a positive result that is subsequently confirmed with a positive PCR test, the test centre is paid for this test; but it will not receive payment for negative tests. This incentive-compatible funding method requires no additional control measures while increasing the incentive to perform tests as diligently as possible because sloppy testing means losing money.

1 For instance, until June 2022, the German government paid testing centres a fee of €4.50 for the test material plus €8.50 for the test and for notifying the public health authority in case a test is positive; see Kassenärztliche Vereinigung Brandenburg (2022).
2 The German government, for example, spent €1 billion per month on services related to coronavirus testing (Süddeutsche Zeitung, 2022).
3 Meanwhile, the first cases of fraudulent testing in Germany have already been to court. For example, the public prosecutor's office reported that in March and April 2021 almost one million coronavirus tests were overbilled by the approximately 70 COVID-19 rapid test centres operated by the MediCan company (Burger, 2021).
4 This practice has recently been changed in Germany. With the Third Ordinance amending the Coronavirus Testing Ordinance, citizens will continue to be entitled to free testing only under certain conditions. Otherwise, they have to pay €3 for a test. We do not see how this will reduce incentives for fraudulent testing on a large scale. Moreover, with an increase in infection rates, we expect that the calls for tests free of charge will become louder.

However, the former compensation for tests, e.g. in Germany, at the rate of €11.50 would not be sufficient under this proposed scheme. Assuming that 20% of positive rapid tests prove also PCR positive and a monthly budget of, say, €460 million and 20 million tests per month, one could pay as much as €115 per confirmed positive rapid test. A further advantage of this scheme is that it can (and must) be adjusted to variations in the incidence over time and across regions. With higher (lower) incidences, the sum paid per positive test must decrease (increase) to provide proper funding of the test centres.

A variant of this financing system is to initially pay at least the material costs of €3.50 per test, in addition to the payment for confirmed positive tests. Assuming a test budget of €460 million per month, after deducting the material costs for 20 million tests per month, i.e. €70 million, €390 million would still be available to pay for rapid tests. Assuming, as above, a PCR confirmation rate of 20% per positive rapid test, €97.50 could be paid per PCR-confirmed rapid test.

A downside of this proposal might be that the number of test centres decreases and the lower number of test sites will probably decrease the number of rapid tests. With regard to the goal of detecting as many infections as possible, this would only be harmful if those who have a higher risk of infection no longer were tested. This is not expected. A high number of tests will not help fight the pandemic if they are carried out sloppily or just faked. The benefits of this proposal – a lower number of scams and sloppy testing procedures – justify the price.

Another issue might be that some of those who tested positive may approach other test centres to be tested again in order to allow them to collect another €100, in exchange for a bribe. This can be prevented by recording the payment of the fee in a central data base that is then checked for duplicate payments. Even if that is not feasible (because the government is unwilling or unable to set up such a central database), mandating a one- or two-week quarantine for those whose infection has been confirmed by a PCR test should make this kind of fraudulent behaviour too costly for most people.

Vaccination certificates

The other issue of fraudulent behaviour concerns counterfeit vaccination records. For instance, by the end of 2021, German investigations have been ongoing against more than 11,000 people who have been accused of using counterfeit vaccination certificates (Stern, 2021). This may be just the tip of the iceberg. Since the start of the German vaccination campaign until the beginning of 2022, the number of digital vaccination certificates issued exceeds the number of vaccinations by 42.6 million (Will et al., 2022). Of course, some people were issued multiple vaccination certificates because they lost their original certificate or because they were automatically issued a certificate even though they had already obtained one. But this does not explain the enormous gap between vaccinations and issued vaccination certificates.

Indeed, counterfeit vaccination certificates are widely offered for sale on online markets. The certificates are easy to forge because they contain no security features and there is no central vaccination register. However, pharmacies are able to check via a server whether the batch number stated in the vaccination certificate really exists and has been put to use.

The economic theory of crime teaches that crime prevention requires sufficiently high penalties and a sufficiently high probability of detection. High penalties are of course cheaper; however, they are subject to limits because there is always the chance that a judicial error may occur. Therefore, one cannot rely too much on penalties and must assure a sufficiently high probability of detection.

There are not many ways to prevent the forgery of paper certificates. However, as an immediate response one could prevent the transfer of forged vaccination certificates without adequate checking of the digital vaccination pass.

A simple two-way verification procedure could work as follows:

- The person to be vaccinated has to prepare two pre-stamped envelopes. One envelope is addressed to the doctor (or vaccination centre), the other to the vaccinated person.
- The doctor vaccinates and records the kind and date of the vaccination in the vaccination certificate, hands it over to the vaccinated person and keeps the letter to the vaccinated person on file.
- The vaccinated person presents the vaccination certificate and his or her identification to the pharmacist and hands over the pre-stamped letter addressed to the doctor. The pharmacist generates the barcode and mails it in the pre-stamped letter to the doctor.
- The doctor forwards the barcode in the pre-stamped letter to the vaccinated person.

This procedure does not require significant effort. However, the pharmacy has to verify the doctor's name and address. Statutory health insurance physicians are registered with the health insurance organisation. However,

private doctors are not, which may be a problem. But generally, even a simple Google search may be sufficient.

In a completely digitised society, another method to fight fraud is feasible, but more complex as it relies on some asymmetric cryptographic techniques. The main feature of those techniques is that there is a public and a private key to encrypt or decrypt data. The private key is in the possession of the owner and not shared with the public. The public key is shared with the public, i.e. everyone can use it to code or decode messages to and from the owner of the private key, that person being the only one able to decrypt data encrypted by means of the public key. This principle also works the other way around: The owner of the private key encrypts a message or data by means of the private key, which also creates a corresponding pubic key. This message can only be decrypted by using the corresponding public key; any message that cannot be decrypted by the public key is not from the owner of the corresponding private key.

By using this technology, a procedure to reduce the number of forged vaccination certificates reads as follows:

- The doctor generates a private and a public key; the public key is shared with the public (e.g. stored on a public server), the private key is only known to the doctor.
- After vaccinating a patient, the doctor generates a barcode that contains personal data and vaccination data of the patient, using the private key.
- To control the vaccination status of a person, everybody can decipher the barcode by using the public key. If the barcode cannot be decrypted by means of the public key, the code is forged.

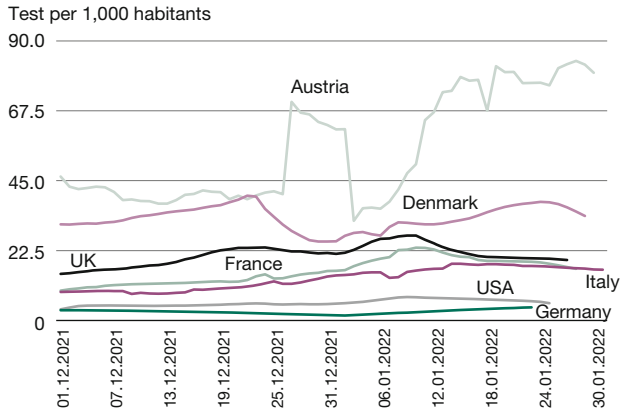
The advantage of this procedure is that no central vaccination register is required, and there is no data protection problem. However, vaccination certificates can still be forged by dishonest doctors.

Inefficient testing

Another failure of the containment policy concerns the lack of sufficient testing capacity, aggravated by inefficient testing methods. This problem was particularly severe in Germany and England (BBC, 2021). Of course, widespread testing combined with following up the chains of infections is essential for the containment of a pandemic. Some other countries seem to have sufficient testing capacities. Austria is a European country that did a better job in testing. For example, in Vienna PCR mouth rinse/gargle tests are available free of charge for anyone who lives, works or attends school in Vienna. People register online, receive a barcode and pick up a test kit at a drugstore or pharmacy. After performing the test at home, people deliver the test to a supermarket, gas station or drugstore that hands in the sample to the laboratory, which uses pooling methods. This makes those tests fairly cheap. In fact, the Viennese laboratory operator Lifebrain charges only €6 per test, in sharp contrast to Germany, where prices in the range of €70 and higher are common (Macho and Salz, 2022). According to the co-manager of Lifebrain, it is the pooling method that saves resources and makes the test cheap. Other contributing factors are economies of scale, centralisation and automation.

Figure 2

New coronavirus tests per 1,000 inhabitants in selected countries (smoothed), December 2021-January 2022

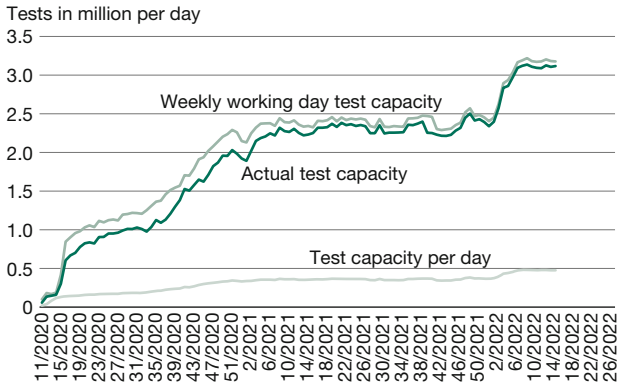


Source: Our World in Data (2022), own depiction.

Figure 2 shows how the number of new tests per 1,000 inhabitants varied across selected countries (Austria, Denmark, France, Italy, Germany, the UK and the USA). Among these countries, Germany carried out the lowest number of tests per 1,000 inhabitants. Germany also failed to install sufficient testing capacity and failed to follow-up the chains of infections. Figure 3 displays the testing capacities per day in Germany.

Instead of testing each individual sample, one can instantly increase the capacity for testing by testing pools of samples. A simple pooling procedure involves taking two samples per person and combining one of the two samples in a pool and testing the pool. If the pool tests negative, all samples within that pool must be negative as well. If the pool tests positive, all members of that pool are tested individually using the second sample. Pooled testing works because the pathogen shows up equally in individual and in pooled samples. However, the pool should not be too large, because otherwise a loss of sensitivity associated with sample dilution may become critical.

Figure 3
Test capacity in Germany



Note: By calendar week and year.

Source: RKI (2022).

In Germany, the testing of pooled samples has been used since the 1990s to test donated blood for HIV and hepatitis viruses. Currently, it is also applied to test for infections with the coronavirus in schools and childcare centres (Schlenger, 2020; Koestler, 2021). The pooling method is also suitable for testing employees in a company, students, and staff in schools, hospitals, as well as nursing home staff and inhabitants.

Pooling is far more efficient than the exclusive testing of individual samples (Dorfman, 1943; Gollier and Gossner, 2020). However, one can considerably improve the testing of pooled samples with the following method that makes use of binary codes (Wolfstetter, 2022).

We explain the proposed pooling method with a simple example. Suppose a group of seven people {1,2,3,4,5,6,7} shall be tested. In the first step, one represents each person's number by its binary code, and then proceeds to test an intelligently designed collection of pooled samples. Binary codes represent data using a sequence of binary symbols, typically 0 and 1. Binary codes are concise and efficient. For example, a binary code of length 3 allows the unique representations of the integers 1 to 7, length 5 to 31, length 10 to 1,023, and length 15 to 32,767. The binary codes that represent the seven people to be tested are:

$$1 \rightarrow (001),\ 2 \rightarrow (010),\ 3 \rightarrow (011),\ 4 \rightarrow (100),$$
$$5 \rightarrow (101),\ 6 \rightarrow (110),\ 7 \rightarrow (111).$$

There, the last 1 represents $2^0 = 1$, the second last $2^1 = 2$ and the first $2^2 = 4$, and the reverse mapping from binary code to person is defined as:

$$(001) \rightarrow 1\times2^0 + 0\times2^1 + 0\times2^2 = 1$$

$$(010) \rightarrow 0\times2^0 + 1\times2^1 + 0\times2^1 = 2$$

$$(110) \rightarrow 0\times2^0 + 1\times2^1 + 1\times2^2 = 6$$

$$(111) \rightarrow 1\times2^0 + 1\times2^1 + 1\times2^2 = 7.$$

In general, the binary code of length L: $(v_1, v_2 \ldots v(_{L-1}), v_L)$ represents $\sum_{i=0}^{L-1} v_{L-1} 2^i$ persons, where each v_i is either zero or one, and at least one v_i is equal to one. Having represented persons by the binary codes, one applies the following testing procedure:

- Take samples from each of the seven people and split each into four copies. (Keep one additional copy on reserve in case one also considers sub-pools.)
- Deposit a copy of each person's sample into that person's test tube and copies into pooled test tubes (called pools).
- Specifically, put a copy from the sample of each person with a 1 at the last digit of their binary code into pool 1, a copy from the sample of each person whose binary code has a 1 at the second last place into pool 2, and a copy from the sample of each person who has a 1 at the first place into pool 3.
- Test each of the three pools and record which pool(s) tested positive.

Note that copies of a person's sample may be included in several pools. For example, copies of the sample of person 3, with binary code (011), are included in pools 1 and 2, and those of person 7 are included in all three pools, whereas those of persons 1, 2 and 4 are included in only one pool each.

Having tested the three pools, the infected persons are identified as follows: If only one pool tested positive, say pool 1, then the one person with binary code (001), and no one else, is infected. In that case, one has uniquely detected who is infected. The important observation is that no person with a 1 in positions other than the last place of its binary code is infected. This drives the conclusion that person 1 with binary code (001) must be the one and only one who is infected.

In this case, only three tests (the tests of three pools) are needed to detect who is infected, whereas the standard method of testing all persons would include performing seven tests, and the standard method of testing one pool would include performing eight tests (one test of the pool, followed by seven individual tests, after having observed that the pool tested positive).

If two pools tested positive, say pool 1 and 2, one knows that all persons with a 1 in the first place of their binary code cannot be infected. Therefore, the infected person(s) must be among those with binary codes {(001), (010), (011)}. In other words, the infected person(s) must be among persons {1,2,3}. In that case, one could continue to test these three persons. However, one can do better, for example, by testing the sub-pool of persons with binary codes {(010), (011)}[5]. If this sub-pool tests negative, one can infer that person 1 and no one else is infected; only if this sub-pool tests positive would one have to test all three persons. In that case, the infected person(s) are identified in at least four and at most six tests, whereas the standard method of testing all persons' samples would have performed seven tests and the standard pooling method eight tests.

If all three pools tested positive, one could continue and test all seven persons. However, one can do better, for example by testing the sub-pool of persons {3, 5, 6, 7}, with binary codes {(011), (101), (110), (111)}. If this sub-pool tests negative, one can infer that persons {1, 2, 4}, with binary codes {(001), (010), (100)} must be infected, and no one else; only if this sub-pool tests positive, would one have to test more persons.

Finally, if all pools tested negative, one concludes that no person is infected. In that case, the standard method of testing all individual samples would have performed seven tests and the standard pooling method would have performed one test, whereas the proposed pooling method performed three tests. Therefore, if it is highly likely that no person is infected, the standard pooling method performs best. We conclude that the proposed pooling method is more efficient than the standard methods, except if it is most likely that either all persons are infected, in which case it is best to simply test all persons' samples, or no person is infected, in which case it is best to employ the standard pooling method.

We mention that the standard pooling method is not effective if one tests in hot spots with high infection rates. For example, if infection rates are around 30% or higher, the probability that the pool tests positive, and subsequently all individuals have to be tested, is close to one. This can be seen in Table 1, which displays the probability that the pool tests positive, depending on the size of the pool n, and the infection rate x. The standard pooling method has been widely used in Austria with a pool size of n = 10.[6]

Table 1
Probability that a pool tests positive depending on the infection rate

	Infection rate (x)		
Pool size (n)	x = 0.1	x = 0.3	x = 0.5
10	0.651322	0.971752	0.999023
11	0.686189	0.980227	0.999512
12	0.71757	0.986159	0.999756
13	0.745813	0.990311	0.999878
14	0.771232	0.993218	0.999939
15	0.794109	0.995252	0.999969

Source: Own calculations.

If one tests larger groups of people, the expected saving from using the proposed pooling method is increasing, although designing an efficient sequential procedure to detect who is infected becomes more complex. However, one could write a computer programme that provides complete instructions to those who run the tests. Equipped with such a programme, running the tests requires no understanding of the complexity of the procedure. Finally, we mention that the proposed pooling procedure is particularly efficient if one happens to know how many people are infected. In particular, if one knows that only one person is infected, one knows immediately who is infected after testing all three pools. For example, if only pools 2 and 3 test positive, one can infer immediately that person 3, with binary code (011), is infected.

Conclusion

In this short article, four pressing issues of the fight against the coronavirus pandemic are discussed from an economic perspective: the vaccination gap, test-billing and vaccination fraud, as well as the shortage of testing capacity, aggravated by inefficient testing methods.

If one wants to close the vaccination gap, a vaccination register is required. To make such a register safe for falsifications, a two-sided mechanism is proposed that makes sure that only real vaccinations are documented. As this mechanism is not completely foolproof, it cannot be completely guaranteed against criminal infringements.

The billing of rapid antigen coronavirus tests suffers from its ineffectiveness, as well as from its economic inefficiency. The reason for these tests is to discover coronavirus infected persons as quickly as possible and to check positive tests with a more accurate PCR test. Economically, the detection of infected persons should be incentivised and documented by a PCR test. Therefore, it is proposed to pay rapid antigen corona tests (beside the payment for test material) only if a positive

5 However, this requires that one splits persons' individual samples into more than four copies.

6 The probability that the pool tests positive is equal to $1 - (1-x)^n$, assuming infections are independent events. This assumption is, however, too restrictive if the members of the tested group have been in close contact with each other.

PCR test is documented in the respective cases. However, the payment per positive PCR test must be set sufficiently high.

With restricted capacities for PCR tests, more sophisticated test strategies are required. Pool tests are already common in Germany. In this paper, a refinement of pool testing with binary codes is proposed that increases the PCR testing capacity considerably.

Even if the new mechanisms proposed in this paper may not be applied in the coronavirus pandemic, they could be implemented in advance for similar future crises. As the expression goes, prevention is the best medicine.

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DOI: 10.1007/s10272-022-1076-z

Intereconomics, 2022, 57(5), 337-338

JEL: F15, F51, F55

The Cost of War: A Comment and a Reply

In the July/August issue of *Intereconomics*, Ilona Sologoub argued that increasing the cost of war would limit the ability of an authoritarian state to wage a war. Here, Charles D. Coleman comments on this statement and offers clarification, followed by a reply from Sologoub.

Charles D. Coleman

The Cost of War: A Comment on "Ukraine's EU Integration: A Long Way Home" by Sologoub

Sologoub (2022) mischaracterizes my argument (Coleman, 2002) for democracies' being less likely to go to war than dictatorships. I do not claim, contrary to Sologoub (2022), that the cost of war is the deciding factor. Instead, I argue that governmental structure is decisive. An autocrat's ability to allocate the benefit of war to himself while imposing the cost on his population increases his willingness to go to war compared to a democratic government whose people bear both the benefit and cost of war. The autocrat simply sees a many times higher net benefit to himself than does a citizen of a democracy, who may very well see a net cost. In the polar case of pure autocracy, increasing the cost of war has no effect on an autocrat's decision making because the autocrat does not bear the cost. The only exception occurs when economic damage reduces the autocrat's ability to extort rents. Note that this is a necessary but not sufficient condition. History has examples of autocracies whose citizens accepted very high war costs, whether by force or ideology.

Rather, deterrence to war is created by reducing the resources available for war and creating the risk that the autocrat will lose power. The latter is done by going to war with the autocrat or by creating internal withdrawal of support for an autocratic regime. Some Russians have already demonstrated their opposition to the war in Ukraine by leaving Russia, protesting within and outside Russia and engaging in sabotage. The internationally forced reduction in imports has reduced Russians' standard of living. The Russian military's dependence on imported semiconductors has resulted in its severely reduced ability to rearm after foreign supplies were cut. The increasing number of lost servicemen has damaged Russian citizens' morale, especially when the losses are covered up. Due to preference falsification (Kuran, 1995), Chapkovski and Schaub (2022) find that Russian war support is lower than reported by standard opinion polls. To gain an idea of the true changes in Russian war support, Chapkovski and Schaub's (2022) experiment should be repeated regularly with the addition of testing for preference falsification regarding support for Putin. Revolution or rebellion may occur in Russia should support for the war and Putin fall low enough (Kuran, 1995). Since war support varies across Russia, the outbreak of rebellion could create civil war between areas of strong and weak support for the war with Ukraine.

Open Access funding provided by ZBW – Leibniz Information Centre for Economics.

* This work reflects private research by the author. Therefore, the U.S. Census Bureau bears no responsibility for its contents.

Charles D. Coleman, U.S. Census Bureau, Washington DC, USA.

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Ilona Sologoub

The Cost of War: A Reply

I thank Dr. Coleman for his comments and additional explanations. Taking into account that it is people who bear the cost of war both in democracies and autocracies, I think one can infer that democratic governments are less likely to start a war because they are more responsive to public opinion, i.e. the feedback mechanisms from people to government is much more sensitive in democracies, while autocracies often deliberately break down these mechanisms. For example, when Putin became the president in 2000, the first thing he did was to destroy more or less independent media. This mission was accomplished by 2002. In Ukraine, then President Kuchma's attempt to destroy independent media (by, among other means, killing the journalist Georgy Gongadze) resulted in mass protests that lasted from November 2000 until March 2001.

As for the Russian society, while I can agree that war support there may be lower than officially reported, Chapkovski and Schaub's (2022) experiment shows that it is still very high. Whether it is 70% or 80% is not that important. If people are afraid to even tell pollsters what they think, one cannot expect them to create an active protest movement. In addition, the question that is not asked by Chapkovski and Schaub (2022) is – why do some Russians not support the war? Judging from what we hear from Russian opinion leaders who have now left Russia and are very vocal in Europe and the EU, and from what we see in Russian social media, very few Russians feel compassion for Ukrainians. Rather, they understand that sanctions will lower their standards of living and that the war outside Russia inevitably implies more repression inside the country (both are aimed at cementing support for Putin). Moreover, during the past six months, Russians have written about 145,000 delations about people who "distribute Ukrainian propaganda", i.e. try to tell the truth about the war (Focus, 2022). The majority of the population that supports the war is much more aggressive and ready to act than the minority that does not.

While a civil war in Russia is possible, it will not be between those who support the war and those who do not. It will have either ethnic or economic reasons (i.e. peoples of Russia will demand independence as they did in 1990 (Corbet and Gummich, 1990) or people will demand that more taxes stay within their own region rather than go to Moscow), or both, as the Russian empire continues to dissolve. Historically, losing a war has accelerated the dissolution process and triggered revolutions in the Russian empire (e.g. 1903-1904 war with Japan or WWI).

Hitler's Nazi state was defeated by allies bombing Germany and occupying Berlin. Now the civilized world must consider what Putin's defeated Nazi state will look like.

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Open Access funding provided by ZBW – Leibniz Information Centre for Economics.

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DOI: 10.1007/s10272-022-1082-1

Intereconomics, 2022, 57(5), 339-340

JEL: E31, D72

The Most Consequential Midterms in History

American voters go to the polls every two years to elect an array of various officials: The presidential election is held every four years, members of the House of Representatives are up for re-election every other year and Senators serve six-year terms. Midterm elections historically generate lower voter turnout than presidential elections. Only about 40% of those eligible to vote go to the polls in midterm elections, compared to turnouts of about 50%-60% for presidential elections over the past 60 years. The midterms are seen by some as less important as they are more local than the national presidential election. But the 2022 midterm elections might wind up being the most consequential in American history.

As midterms are the first elections held in a president's term and at the halftime mark, they are generally seen as a referendum on the sitting president and his party. Dissatisfied voters are typically more motivated to vote, often voting against one candidate rather than for another. This helps explain why the president's party regularly suffers significant losses in the midterms. President George W. Bush's Republicans took a "thumping" in 2006, Obama's Democrats got a "shellacking" in 2010 and even President Trump's Republicans were not immune to a blue wave in 2018.

The loss of a party's majority in the legislative branch, which Democrats currently hold, is often the result of voters' perceptions about how things are going – whether this be directly the result of an administration's policies or not. And the best example of this today is voters' concerns about the economy. If history is any indication, voters will punish the president and his party for what they see as their responsibility for current record high inflation levels.

An example: In 1965, Lyndon B. Johnson had an approval rating of 70%, buoyed by a number of successful legislative programs, including welfare and immigration reform and Medicare. In the run-up to the 1966 midterm elections, Johnson's Democrats held a strong majority in Congress and the Republican party was all but dead.

So how did Republicans turn the tables to stage one of the most stunning political comebacks in political history? Milk. The price of milk had skyrocketed, and people were protesting in the streets. Seizing the moment, Republican candidates brought grocery carts to campaign events and blamed Johnson's welfare reforms for the rising food prices and growing inflation. This tactic not only worked, it resulted in one of the biggest losses ever seen in a midterm election. And the "milk playbook" is still being used today.

The economy has always been one of voters' key concerns. People typically "vote their pocketbooks." Much to the dismay of the White House, price increases remained rapid in August on many goods and services despite the fall in gas prices, defying expectations of an inflation slowdown. According to the Consumer Price Index, in August prices were up 8.3% from the previous year. The cost of rent, restaurants and medical care are soaring. Although the Fed has been raising interest rates since March in an attempt to cool things off and tamp down on inflation, it has so far done little to reverse the trend.

And voters have noticed. A recent New York Times/Siena poll found that 49% of respondents said that concerns about "economic issues such as jobs, taxes or the cost of living"

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Open Access funding provided by ZBW – Leibniz Information Centre for Economics.

would have the greatest influence on how they will vote in the midterms. More than half of those polled said they found Republicans stronger on the economy versus 38% who said they agreed with Democrats.

Enter the milk playbook. Republican candidates are eschewing issues that have taken center stage in the past such as immigration and culture wars and instead focusing their campaign messaging on inflation. Nancy Mace, a Republican House candidate from South Carolina announced in a television advertisement that she has "had it with crazy inflation" and then proceeded to tally up the cost, item by item, of a typical breakfast.

Although average actual real incomes have gone up due in part to temporary tax cuts and pandemic relief supplements, many Americans are feeling the effects of higher prices on household goods and a message like Mace's really resonates.

It is no surprise then that Democrats have gone on the defensive, directing voters' attention toward legislative and administrative actions to curb inflation such as the federal gas tax, releasing oil from the strategic petroleum reserve, pushing companies to refrain from price gouging and giving Medicare the authority to negotiate drug prices.

Democrats are also focusing heavily on other issues that they believe will motivate youth and women voters in particular to turn out, including the June Supreme Court decision to overturn Roe v. Wade, the 1973 court decision guaranteeing the right to abortion. Biden's plan to forgive a portion of student debt and the recent landmark climate legislation are also strong selling points.

But just as the milk playbook is a tried and true strategy to rile up voters, there is a new playbook that is being tested for first time in the 2022 midterm election with alarming frequency that has potential consequences far beyond the ballot box. We could call it the "electoral integrity playbook."

These elections will be the first to take place since the 2020 presidential election. After claiming victory on election night, President Trump continued, as he had done throughout the campaign period, to lambast the integrity of the electoral process, claiming that if he lost, it would be due to voter fraud. This claim, also referred to as "the big lie," and his unsubstantiated challenges to the voting process in numerous large cities in swing states have sown the seeds of doubt so deeply that a recent survey found that 70% of Republican voters do not believe that Biden is the legitimately elected president.

This doubt in the electoral process fed by Trump and his supporters has led to a number of voter suppression laws passed in multiple states as well as a strong increase in partisan poll workers who have been encouraged to look for any signs of voter fraud. While observation is an important way to ensure transparency, party affiliations of observers threaten their neutrality, potentially making their involvement more of a hindrance than an assurance of a smooth democratic process.

Candidates have also indicated that they may not be willing to accept the outcome of an election due to pre-emptive claims of voter fraud, blighting unwritten rules and accepted norms that are essential to a smooth transition of power and a functioning government. Should partisan observers block the process with overblown or bogus claims of irregularities and candidates refuse to concede, the system will unravel.

The US, once seen as an example of a strong and vibrant democracy, may become a playbook for how easy it is to destroy one. And if the seeds of doubt take root and voters lose faith in the electoral process, we will have much bigger problems than the rising cost of milk.

Intereconomics

Review of European Economic Policy

Issued by

ZBW – Leibniz Information Centre for Economics
CEPS – Centre for European Policy Studies

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Open Access funding provided by ZBW – Leibniz Information Centre for Economics.

Abstracted/Indexed in:

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ISSN 1613-964X (electronic edition) 0020-5346 (print edition)

2 Electronic edition

An electronic edition of this journal is available at:

SpringerLink: link.springer.com/journal/10272
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Printer

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30457 Hannover, Germany
Printed in Germany, on acid-free paper

Springer is a part of Springer Science+Business Media
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Officially cited as: *Intereconomics*