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The series is available online at www.bancaditalia.it .

ISSN 1972-6643 (online)

Designed by the Printing and Publishing Division of the Bank of Italy

EU INDUSTRIAL POLICY BETWEEN CRISES AND THE TWIN TRANSITION

by Claire Giordano*, Giacomo Roma†, Alessandro Schiavone‡,
Filippo Vergara Caffarelli‡ and Stefania Villa§

Abstract

In the context of the twin (digital and green) transition, this paper first describes the impact of the exceptional shocks on growth and external competitiveness of the EU industrial sector since 2020. It then takes stock of the industrial policy instruments and initiatives undertaken by the EU in order to counteract these crises and to rise up to the ongoing structural transformation. Being a supporting competence of the EU, industrial policy consists both of national and EU measures. We document how industrial policy-related State Aid, based on national resources and objectives, is the largest instrument by funding, while the amount of resources assigned to EU-level instruments (including Horizon Europe, the Important Projects of Common European Interest and InvestEU) is far more limited. The paper also underscores the greater emphasis in the recent approach of EU industrial policy on 'vertical' measures, by analysing four sectoral initiatives on critical raw materials, clean technologies, chips and defence. Overall, an effective EU industrial policy requires a collaborative approach, coordinated strategies and adequate, targeted and conditional funding, to boost competitiveness and mitigate the risk of widening divergence across Member States.

JEL Classification: E32, F10, L5, O25.

Keywords: EU industry, competitiveness, EU industrial policy, State Aid, strategic sectors, defence.

DOI: 10.32057/0.QEF.2025.931

* Banca d'Italia, DG for Economics, Statistics and Research, Statistical Analysis Directorate.

† Banca d'Italia, DG for Economics, Statistics and Research, Structural Economic Analysis Directorate.

‡ Banca d'Italia, DG for Economics, Statistics and Research, International Relations and Economics Directorate.

§ Banca d'Italia, DG for Economics, Statistics and Research, Economic Outlook and Monetary Policy Directorate.

1. Introduction*

The European Union's (EU) long-run growth performance relative to the US has been long debated. After its strong post-World War II catch-up growth, there is consensus that the EU's falling behind since the 1990s is the combined result of a severe productivity slowdown in traditional manufacturing and a failure to invest in and reap the benefits from Information and Communications Technology, in particular in market services (Timmer et al., 2011).[1] More recently, as underscored by the so-called *Draghi Report* (Draghi, 2024), structural delays of the EU have emerged in industrial sectors key to the ongoing twin transition, namely *vis-à-vis* the US, which exploit economies of scale in investment and know-how for the digital transition, and *vis-à-vis* China, which relies on the availability of vast resources and of technological know-how for the green transition.[2]

Since the beginning of 2020 the competitiveness of EU industry has been further challenged by a series of unprecedented shocks (Panetta, 2023), namely the COVID-19 emergency, the subsequent supply and logistic bottlenecks in global value chains, and the energy crisis related to Russia's invasion of Ukraine, to which the EU was more exposed than the US or China. Finally, both heightened geopolitical tensions – including the "first" US-China trade war, the conflicts in Ukraine and in the Middle East, and the risks of tariff escalation under the new US administration and of US disengagement in Europe's security – and the return of industrial policy in all major economies have further exacerbated international supply chain risks and threatened economic security, as well as the level playing field.[3]

Despite all these challenges, the industrial sector remains vital for the EU's competitiveness.[4] In addition to the sector's large size in the total economy with respect to the US (Figure 1a) and to its

* Policy paper put forward by the DG ECS European Affairs Committee, based on data and policy documents available until 11th March 2025. We thank Francesco Paolo Conteduca for sharing the Trade Data Monitor data, Irene Di Marzio for sharing the State Aid data and Valentina Longeri for some research assistance. We are grateful to Luigi Federico Signorini, Antonio Accetturo, Riccardo Cristadoro, Silvia Fabiani, Stefano Federico, Antonella Foglia, Riccardo Settimo, Carla Stamegna, Roberto Torrini, Fabrizio Venditti, Giordano Zevi and Stefania Zotteri for their useful comments on previous drafts and during presentations. The views are those of the Authors' and not of the represented institution.

[1] Similar evidence has been drawn specifically for Italy, where the disappointing performance of the Italian economy after 1993 was largely explained by slow labour productivity dynamics in the dominant services sector (Giordano and Zollino, 2021).

[2] The twin transition can, however, also provide opportunities for EU industry. For the digital transition, see the *Draghi Report*, p. 20: "While some digital sectors are likely already "lost", Europe still has an opportunity to capitalise on future waves of digital innovation. (…) Europe holds a strong position in autonomous robotics, hosting around 22% of worldwide activity, and in AI services, hosting around 17% of activity." For the green transition, see Della Corte, Federico and Oddo (2024) for the comparative advantages of the main EU economies in some key products such as those related to clean energy and renewables (turbines, generators and electric motors). On the other hand, the competitiveness of EU industry has also been found to be negatively affected by regulatory burdens and strict compliance rules, which are however not specifically addressed in this paper. On this aspect see, for example, Garicano, (2024), Draghi (2025) and Filip et al. (2025), but also the recent *Competitiveness Compass* of the European Commission (Commission Communication COM(2025) 30 final, 29 January 2025), which sets out a roadmap towards simplification.

[3] See Bown (2024) for a definition of economic security. During this period the UK also completed its withdrawal from the EU, and the subsequent Trade and Cooperation Agreement was struck. While Brexit was a major geopolitical shift that triggered macroeconomic consequences for the EU, it was not an event that dramatically changed EU industrial policy, with the exception of the defence sector. We will therefore not cover post-Brexit UK in this paper, if not with regards to considerations on defence.

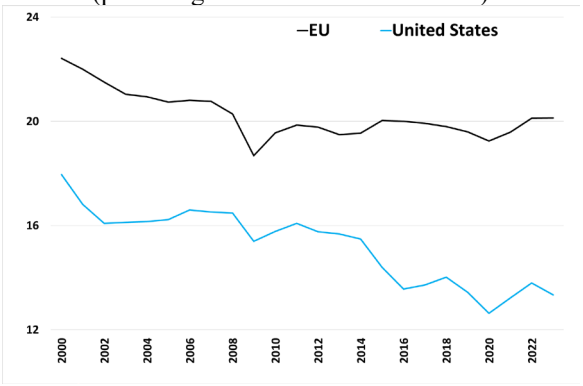
[4] On this, see for example the Clean Industrial Deal, COM(2025) 85 final of 26th February 2025, p.1: "Europe's industrial base is central to our identity and essential for our competitiveness. Our continent has a rich industrial heritage. For decades, our industries have been at the forefront of technological progress. They fuelled economic growth and sustained

significant contribution and positive correlation with overall economic growth (Figure 1b), innovation and technological progress often see the light in industry, which then generates important productivity gains and spillovers, particularly to services. Industry is also paramount for employment, exports, strategic autonomy and national security, as well as for social inclusion and equality.

Figure 1 – The role of industry in the EU economy

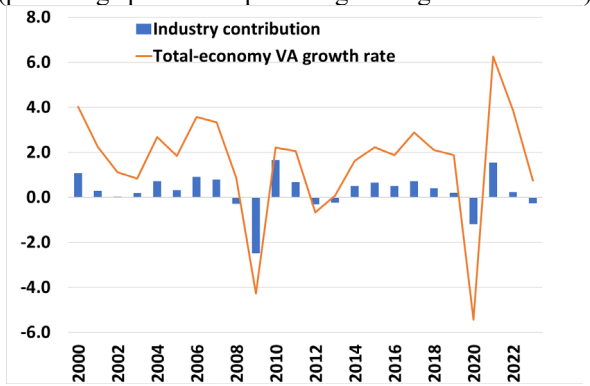
a) Industry (net of construction) value added shares

(percentage shares on current values)



b) The contribution of industry (net of construction) to annual total-economy growth

(percentage points and percentage changes on volumes)



Source: Eurostat for the EU and Bureau of Economic Analysis for the US.
Notes: The share for the EU is computed over total value added, for the US over GDP due to data availability.

Industrial policy is key to boosting the competitiveness of industry. Although the definition of industrial policy remains controversial in the literature, an emerging approach is the one put forward by Juhász et al. (2023), which identifies industrial policy as "those government policies that explicitly target the transformation of the structure of economic activity in pursuit of some public goal". While this definition allows for vertical (sectoral) policies, there is no consensus on their scope and the optimal mix between these measures and horizontal (cross-sectoral) policies. On the one hand, some scholars claim that industrial policy should be horizontal and put great emphasis on institutions and policies which promote competition, encourage innovation and facilitate industrial change (Owen, 2012). On the other hand, Mazzucato (2013) argues that industrial policy should be mission-oriented, that is State interventions should aim at "steering the direction rather than the rate of investments" based on shared goals. Between these opposite views, some authors call for a combination of horizontal and vertical policies and for an adjustment of vertical policies according to the sectors, targeting those with the greatest degree of within-sector competitiveness (Aghion et al., 2011).[5]

According to the literature (Juhász et al., 2024) there are two main objections against industrial policy. One is that governments are unlikely to possess the information needed to fix market failures. The other is that governments are exposed to lobbying pressures which bias the allocation decision about state subsidies. Moreover, industrial policy measures may distort competition in the market. Favouring some firms at the expense of others (i.e. "picking winners") should therefore be avoided in order to guarantee a level playing field.

our social model. They now need a promising future (…). There is no resilient economy without a robust industrial component."

[5] Along these lines, Altomonte and Veugelers (2019) recommend a combination of vertical measures with horizontal measures ensuring competition and an innovation-friendly environment.

In recent years, EU industrial policy sharpened its focus on strengthening industrial competitiveness, promoting a more sustainable, resilient and digitalised economy that creates jobs,[6] enhancing the EU's open strategic autonomy[7] and boosting the EU's defence industrial base. At the same time, a new approach to EU industrial policy has emerged. Traditional horizontal measures continued to target market failures within the economy, also by boosting R&D activity; in addition, sectoral initiatives were introduced to foster investment in strategic sectors – in particular those in which the EU lags behind global competitors (such as semiconductors and renewables) – and to increase both economic and national security. The objectives of industrial policy also became more deeply aligned with those of EU trade and investment policies in order to pursue open strategic autonomy (Mariotti, 2024a).

In shaping its industrial policy, the EU has had to reckon with its institutional architecture, which is mainly based on the cooperation between the EU institutions and Member States: pursuant to the EU Treaties, industrial policy indeed belongs to the category of supporting competences. The EU can therefore intervene to support, coordinate or complement actions of the Member States, but the latter only adhere on a voluntary basis and remain free in their choice on how to implement industrial policy. No EU-wide harmonization of national laws and regulations in this field can thus be imposed. While the European Commission has limited powers under the legal heading of industrial policy, it has thus far used its (much larger) authority in other contiguous domains - such as competition policy and the achievement of the single market - to increase its role in the design and the coordination of industrial policy measures (Dermine and Patrin, 2024).[8]

This paper first outlines the effects of the recent exceptional shocks and the ongoing structural transformation on the EU's industrial sector, adopting a sectoral perspective. Next, it aims at taking stock of the industrial policy instruments and sectoral initiatives adopted at the national and EU level in order to rise up to the challenges and opportunities of the twin transition in the current unprecedented macroeconomic context, before a potentially new era of international relations begins, bearing in mind some institutional limitations of the EU, such as the fact that in most cases these measures heavily rely on Member States for funding and implementation.[9]

The remainder of this paper is structured as follows. Section 2 examines how the recent shocks and the twin transition have affected the competitiveness of the EU industry, in terms of production, external trade and import dependencies. Section 3 describes the key instruments of industrial policy,

[6] Council conclusions on an EU Industrial Policy Strategy: a Vision for 2030, adopted by the Council at its 3694th meeting held on 27 May 2019.

[7] The concept of EU's strategic autonomy originates from the defence sector (European Council Conclusions, 20 December 2013; see Ioannou and Pérez, 2023).

[8] Indeed, the path towards the introduction of a competence on industrial policy was long and widely debated, and it was added to the Commission's competences only by the Maastricht Treaty in 1992. Conversely, competition policy was included since the beginning (art. 80-90 and 92-95 of the Treaty of Rome in 1957) and it is still a core competence of the Commission. This asymmetry resonates with the unsolved ambiguity of the College of Commissioners which still maintains a highly technical profile, notwithstanding the larger political role it has assumed (on the politicisation of the role of the Commission, see Nugent and Rhinard, 2019).

[9] Our analysis is complementary to other recent studies on EU trade and industrial policy such as Bown (2024) and Hodge et al. (2024). In our paper we do not dwell on the details of the initiatives taken in the automotive sector, nor of financial regulation nor of artificial intelligence. Moreover, some instruments the EU applies to support its industrial policy goals and protect the level playing field, such as trade policy, the regulations on FDI screening and on foreign subsidies, and the Carbon Border Adjustment Mechanism (Bencivelli et al., 2022) fall outside the scope of this analysis. Finally, we do not discuss EU competition policy.

distinguishing between State Aid and those managed at EU level, and provides an estimate of the total amount of resources for industrial policy in the EU. Section 4 presents four relevant sectoral EU industrial policy initiatives on critical raw materials, clean technologies, chips and defence. Section 5 draws some conclusions and policy implications.

2. The impact of recent shocks and the twin transition on the EU's industrial sector

This section assesses the effect of recent shocks (COVID-19 pandemic, supply bottlenecks and energy shock) and ongoing structural transformations on the real economic activity and external competitiveness of the EU. In particular, we first focus on these effects on EU industrial production. We then move to goods external trade and competitiveness of the EU, as well as to an analysis of critical dependencies on the import side. Throughout the section we also delve into sector heterogeneity.

2.1 EU industrial activity

Despite a gradual decline since the 1990s due to the expanding role of services, industry excluding construction still accounts for 20 per cent of total value added in the EU and is a significant driver of growth (again see Figure 1). The industrial share is even larger in Germany (24 per cent).[10]

Figure 2 shows the shares of the main sectors in the EU industrial production index (IPI).[11] Energy-producing sectors represent a large share of IPI, equal to 13.5 per cent.[12] Energy-intensive industries (EI) represent 15 per cent of the total, with metals reporting the highest relative share.[13] Other important sectors are electronics (11 per cent) and transport equipment (10 per cent), while fashion exhibits the lowest share.

Owing to the sequence of shocks discussed in the Introduction, the EU IPI has exhibited a downward trend in recent years (Figure 3a). The severity of this decline varies across EU countries, suggesting heterogeneity in industrial performance, also due to the different exposure to the various shocks. Notably, Germany has struggled to recover its manufacturing output to pre-pandemic levels; the persistent weakness in German manufacturing – affected by supply chain disruptions and subdued demand for key exports – has weighed heavily on overall EU industrial output (Flaccadoro, 2024).

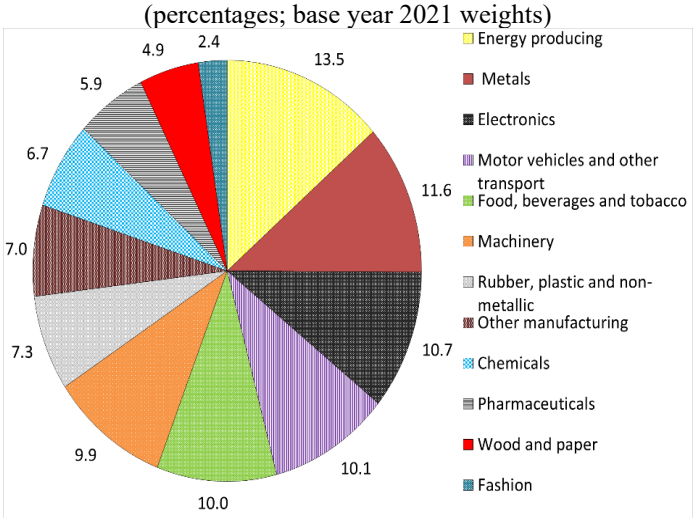
In 2021-22 EU industrial production was significantly impacted by disruptions in goods supply chains, as a result of logistical bottlenecks due to COVID-19-related closures and reopenings in factories and in ports in Asia. Celasun et al. (2022) find that in the euro area manufacturing output and GDP would have been about 6 and 2 percent higher, respectively, in the absence of supply bottlenecks. Figure 3b reports the answers to the quarterly harmonized business surveys coordinated by the Commission regarding the main factors limiting production.[14] Starting from mid-2021 and

[10] By the sake of comparison, this share is 20 per cent in Italy, 16 in Spain and 15 in France.
[11] The year 2021 is currently used as a base for the computation of the index of the Member States in the EU. We do not report the shares in value added, because they are available only for sectors B (mining and quarrying) and C (manufacturing), without any disaggregation, due to confidentiality issues for specific sectors in some Member States.
[12] These sectors are mining and quarrying (B in the NACE classification), manufacture of coke and refined petroleum products (C19), electricity, gas, steam and air conditioning supply (D35).
[13] According to the classification by Alpino et al. (2022), EI industries are paper and paper products (C17), chemicals and chemical products (C20), other non-metallic mineral products (C23) and basic metals (C24).
[14] Possible answers are: none; insufficient demand; shortage of labour force; shortage of material and/or equipment; financial constraints; and other factors.

reaching a peak in the second quarter of 2022, shortage of materials indeed became the most important factor hindering EU firms' production, followed by labour shortages. The overall intensity of supply chain disruptions decreased by the end of 2022 due to the easing of COVID-19 restrictions in China, declining freight rates and the improvements in the backlog management in ports. A similar pattern emerges PMI delivery times reported in Figure A1 in the Annex.

Figure 2 - Shares of main sectors in EU industrial production

(percentages; base year 2021 weights)



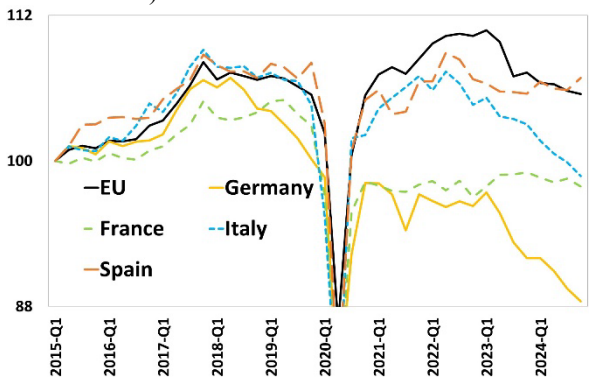
Source: Eurostat.

Notes: Energy producing sectors are: B mining and quarrying, C19 Manufacture of coke and refined petroleum products, D35: Electricity, gas, steam and air conditioning supply. Other sectors (ranked by shares): C24-C25: Manufacture of basic metals and fabricated metal products, except machinery and equipment. C26-C27: Manufacture of computer, electronic and optical products; manufacture of electrical equipment. C29-C30: Manufacture of motor vehicles, trailers, semi-trailers and of other transport equipment. C10-C12: Manufacture of food products; beverages and tobacco products. C28: Manufacture of machinery and equipment n.e.c. C22-C23: Manufacture of rubber and plastic products and other non-metallic mineral products. C31-C33: Manufacture of furniture; jewellery, musical instruments, toys; repair and installation of machinery and equipment. C20: Manufacture of chemicals and chemical products. C21: Basic pharmaceutical products and pharmaceutical preparations. C16-C18: Manufacture of wood, paper, printing and reproduction. C13-C15: Manufacture of textiles, wearing apparel, leather and related products.

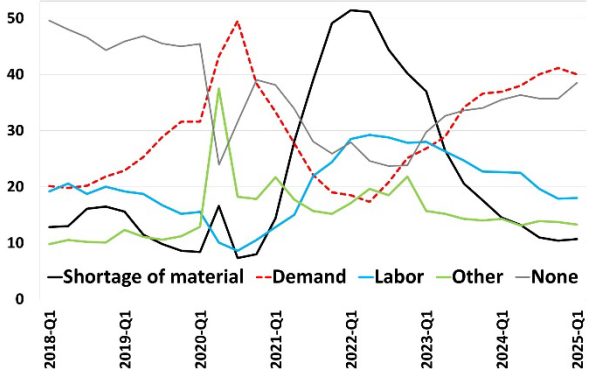
Figure 3 – The industrial production index and factors hindering production

(2015q1=100 for chart a; percentages for chart b)

a) **EU and its main economies**



b) **Qualitative information on factors hindering production**



Source: Eurostat data in chart a) and Eurostat, business survey for total manufacturing, quarterly data in chart b).

Notes: In chart a) data are seasonally adjusted. The trough of the industrial production index in 2020:Q2, which is off the scale, is equal to 86.5 in the EU, 80.7 in Germany, 79.9 in France, 78.9 in Italy and 81.2 in Spain. Data are available up to December 2024. In chart b) the quarterly question in the survey is "What main factors are currently limiting your production?" (multiple choice). Financial factors, accounting at maximum 6 per cent over the period considered, have been removed for the sake of clarity.

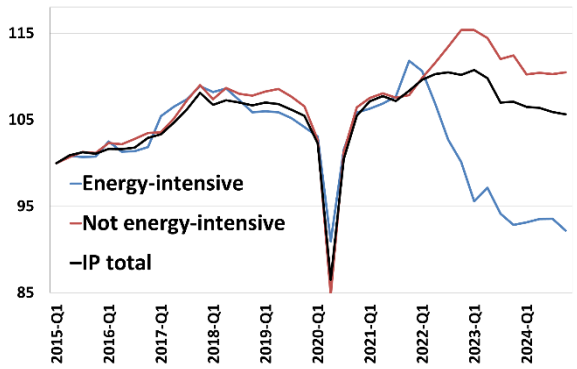
The most affected sectors were those dependent on semiconductors, such as the automotive industry and electronics. These industries were heavily exposed to the volatility of international supply chains, highlighting the EU's reliance on Asian production hubs like Taiwan, South Korea and China for critical components. The shortage of semiconductors not only slowed industrial activity but also revealed this structural weakness in the EU's industrial sector.

The decreasing trend in EU industrial production became more pronounced and widespread across countries after the Russian invasion of Ukraine in February 2022. The conflict disrupted energy supplies, particularly natural gas, critical for industrial production in Europe, and led to a surge in energy prices and supply uncertainties (Corsello et al., 2023). EI industries suffered most and are still suffering from historically high energy prices. The gap between EI and not-EI sectors remains substantial, with no clear signs of narrowing (Figure 4a). The heterogeneity in industrial performance across major EU countries is not due to differences in the comparable share of EI industries but partly to higher energy costs faced by such sectors in Italy and Germany. These elevated costs are partly due to their energy mix, which has historically been heavily reliant on Russian natural gas. In contrast, France is less dependent on natural gas (Gaulier and Serfaty, 2023) and Spain generally features lower energy costs.

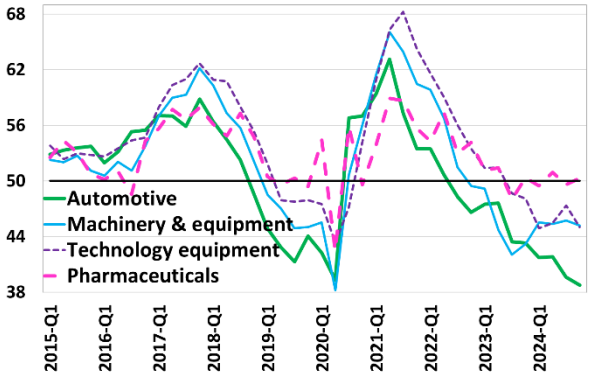
Figure 4. Industrial production by energy intensity and PMI manufacturing

(2015q1=100 for charts a; diffusion indices for chart b)

a) **EU IPI by energy intensity**



b) **EU sectoral manufacturing PMIs**



Source: Eurostat data in charts a) and Markit Quarterly PMI in chart b).
Notes: Data are data are seasonally adjusted and available up to December 2024. In chart a) energy-intensive industries are paper and paper products (C17), chemicals and chemical products (C20), other non-metallic mineral products (C23) and basic metals (C24). In chart b) PMI for pharmaceuticals refers to the sub-index output only because the PMI manufacturing is not available. Values greater than 50 are compatible with an expansion.

Other key sectors also performed poorly, beyond the EI ones, following the post-pandemic rebound. Figure 4b shows the purchasing managers' indices (PMI) in automotive, technology equipment, machinery and equipment, pharmaceuticals.[15] Between 2018 and 2024, excluding the post-pandemic rebound, purchasing managers in most sectors reported conditions compatible with a contraction. In particular, the downturn in machinery and equipment is in part tied to the ongoing weakness in the German economy, whose firms are central to Europe's supply chain. The automotive industry faces challenges from the energy transition, rising competition from Chinese carmakers and

[15] Technology equipment is available from Markit as a sectoral PMI, within the group of technology. There is no one-to-one correspondence to the NACE classification, but this disaggregated PMI provides useful information on business activity of this sector that is important for the competitiveness of the EU economy.

the shift toward electric vehicles. Germany's automotive sector, the largest in the EU, has been hit hard, and its creating ripples effects across Europe's manufacturing (Flaccadoro, 2024). The EU pharmaceutical sector recorded instead significant resilience during the pandemic, ensuring the availability of essential medicines and vaccines. The managers of this sector report opinions compatible with an expansion until the very latest data.

Since 2022, easing material and labour shortages have given way to weakening demand as the main constraint on industrial production (again see Figure 3b). Demand is expected to remain weak also in the coming months, mainly due to the weakness of the German economy, trade uncertainty, geopolitical tensions and the slowdown in China. Based on the same business surveys, the fall in new orders for European firms relative to the pre-pandemic period is broad-based, yet marked especially for the fashion industry, metal products, machinery and equipment and the automotive sector.

2.2 EU external trade and competitiveness, and critical import dependencies

The health of the EU industry is crucially tied to its competitiveness in global markets and to its reliance on external suppliers for strategic goods. In the following sub-section we examine these features, adopting a medium-run perspective whenever possible in order to better contextualize the most recent developments.

2.2.1 External trade and competitiveness

Over the past 15 years the EU as a whole and its main economies (except France) have generally run a current account (CA) surplus, of which the trade balance is the main driver (Figure A2 in the Annex). These economies are indeed net exporters of goods and services, despite strong dependence on energy purchases from abroad.[16]

The EU's strong position in global markets is also confirmed when examining the region's extra-EU export market shares, which are structurally higher (both for goods and services and for goods only) than those of the US (Figure 5a). For the EU as a whole and for goods in particular, the emergence of China in world markets in the 2000s was partially offset by the rising export shares of Central and Eastern EU Member States (Fabiani et al., 2018), leading to a more muted downward trend until 2012 than the US.[17] After seven years of broad resilience, since 2019 the EU market share,

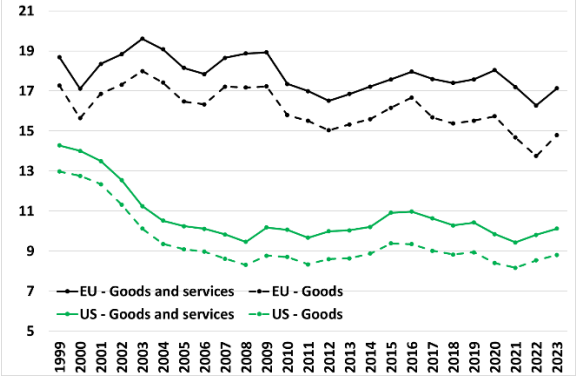
[16] In 2009 the EU's CA deficit structurally switched to surplus, with only a temporary sharp reduction in 2022 due to the energy crisis; in 2024 the EU's surplus was just under 3 per cent of GDP, according to provisional data. Amongst the largest EU countries, Germany registers the most sizeable CA surplus, which peaked at nearly 9 per cent of GDP in 2016 and still remains at around 6 per cent. Italy's CA balance turned positive in 2013; in 2022 it became negative due to the strong natural gas price hike and to the related exceptional deterioration in its energy trade balance (Giordano and Tosti, 2022; Giordano and Tosti, 2024). This outcome was however only temporary as the CA returned to balance in 2023 and to a significant surplus in 2024 (1.4 per cent of GDP, according to preliminary data). Spain's CA balance followed similar developments to Italy's, although it remained positive in 2022 and stabilized in 2024 at around 1 per cent of GDP. By contrast, France is the only large EU economy structurally recording a (contained) CA deficit, due mainly to its negative goods (both energy and non-energy) balance, which is not fully offset by its services surplus.

[17] In this period, goods export market share developments of the main EU economies (in all markets, within and outside the EU) were generally less favourable, as they suffered from heightened competition both from China and from Central and Eastern Europe; stability then ensued, whereas the overall 2019-23 performance depends on the country (namely, declines for Germany and France, against stability for Italy and a rise for Spain).

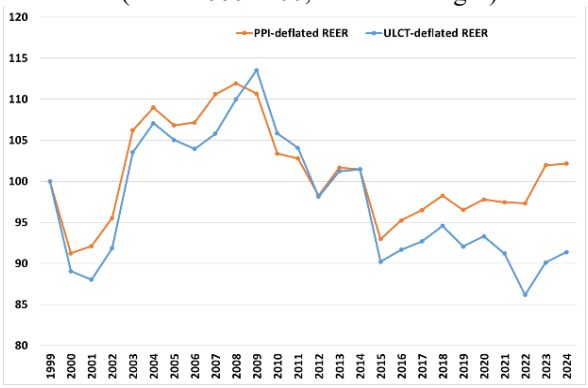
especially as regards goods, has registered a moderate decline, against a broad stability of the US, suggesting that the EU is currently facing challenges to its external competitiveness.[18]

Figure 5 – Export market shares and competitiveness

c) EU export market shares
(percentage shares; current prices and exchange rates)



d) EA price and cost competitiveness
(index 1999=100; annual averages)



Source: Eurostat and calculations on IMF WEO for panel a); ECB Statistical Data Warehouse for panel b).
Notes: In panel a) export market shares of the EU are computed solely in non-EU markets. In panel b), PPI= producer price index; ULCT=unit labour cost of the total economy. An increase (a decrease) in the indicator signals a competitiveness loss (gain). 2024 is referred to the first three quarters in the case of the ULCT-deflated REER.

A key driver of export performance is price/cost competitiveness, proxied by the real effective exchange rate (REER) based on different deflators.[19] The REER cannot be computed for the EU, given that this region does not have a single currency nor exchange rate, but can be calculated for the euro area (EA), which anyhow makes up around 85 per cent of EU GDP and whose export market share also recorded a similar decline to the EU in recent years (Fidora and Gunnella, 2024). After the strong deterioration in competitiveness (however measured)[20] until the 2008 global financial crisis, labour cost competitiveness in the EA improved significantly, in part due to wage compression (Figure 5b). By contrast, price competitiveness improved until 2015 and thereafter recorded a moderate loss, especially since 2022, due to the overall nominal effective appreciation of the euro and to less favourable dynamics in the cost of energy, raw materials and other production factors (excluding labour) relative to the EA's main trading partners than for labour costs.[21] Imported input price pressures indeed play a significant role in the EA's overall competitiveness.[22]

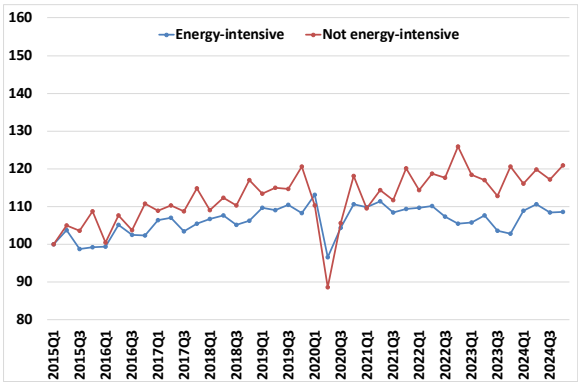
These aggregate export outcomes mask product-level heterogeneity. Similarly to industrial production dynamics observed in Section 2.1, since 2015 the EU's EI exports have performed worse than not energy-intensive (NEI) foreign sales and this negative performance differential widened after

[18] Overall since 2019, the EU's goods export market share has declined by 0.7 per centage points, against a decrease of 0.4 of its total share and against a marginal variation of the US goods export market share of -0.1 points.
[19] Another driver, here not considered, is non-price competitiveness, which captures quality, firm size, R&D activity etc.; on this, see Allione, Federico and Giordano (2024).
[20] For an analysis of different price and cost-competitiveness measures, refer to Giordano and Zollino (2016; 2017).
[21] Again considering the period since 2019 as in footnote 18, the EA producer price-based REER has appreciated by nearly 6 per cent: this outcome is the result of a nominal effective exchange rate appreciation of the euro of about 7.5 per cent and of relative prices decreasing by around 1.6 percentage points. By contrast, over the same period the EA unit labour cost (ULC)-based REER has depreciated by nearly 1 per cent, with the sharp contraction in relative ULCs more than offsetting the strong nominal appreciation.
[22] There is, however, significant heterogeneity in cost and price-competitiveness trends within the EA. For example, over 2019-24 cost competitiveness improved in France and, especially, Italy, but it remained stable in Germany and deteriorated in Spain. Over the same period, producer price competitiveness deteriorated especially in Germany and in general in all main EU countries except Italy, where it remained broadly unchanged.

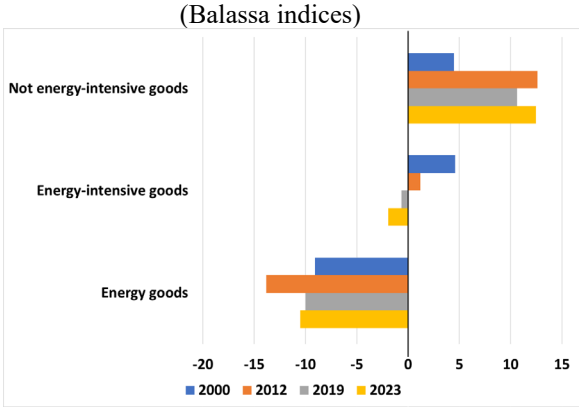
the recent energy crisis (Figure 6a).[23] Another external competitiveness indicator is the trade balance (at current values) of EI vs. NEI sectors, which thus also takes into account external dependence for imports. Figure A3a in the Annex confirms the higher competitiveness of NEI goods in the overall period since 2015. Interestingly, despite the recent energy shock, there is no evidence yet of an increase of the penetration in the EU market of EI goods produced outside the EU, since imports (in volume terms) of these products, after their temporary rise, returned to medium-term values (Fig. A3b). This is consistent with a significantly weaker demand for EI products in the EU than for NEI goods according to recent firm survey data (Figure A3c).

Figure 6 – Product heterogeneity in EU exports

a) Exports by energy intensity
(2015Q1=100; volumes)



b) comparative advantages by energy intensity
(Balassa indices)



Source: Authors' calculations on Eurostat trade data and producer price index data for panel a) and calculations on CEPII-BACI goods trade data for panel b).
Notes: In panel a) exports are computed vis-à-vis non-EU partners. They are estimated in volume terms, based on NACE sectoral trade data, following the methodology in Giglioli and Giordano (2023) and according to the energy intensity classification by Alpino et al. (2022), described in footnote 13. In panel b) product groupings mimic the NACE sectors employed in the afore-mentioned Alpino et al. (2022) classification. The bars refer to the EU's Balassa index in a given product category in the reference year, computed as $BI_{st} = x_{st}/x_t - x_{st}^{WORLD}/x_t^{WORLD}$, where x are goods exports (net of intra-EU trade) in euros, s refers to the reported product grouping, *WORLD* refers to all world exporting countries, and t is the reference year. If the Balassa index for a given product grouping is positive (negative), then the EU has (does not have) a comparative advantage in that product category.

Taking a longer-term perspective, in 2000 the EU actually recorded a similar comparative advantage, proxied by the Balassa index, in both EI and NEI products (Figure 6b).[24] Over the following 25 years, the region consolidated its advantage in NEI goods, which remains significant even in recent years. By contrast, the EU gradually lost its competitive edge in EI products; after the energy crisis, it matured a non-negligible competitive disadvantage in this category. Finally, the EU's comparative disadvantage in energy goods was and has remained very large.

[23] Amongst the main EU economies, EI sectors in Italy and Germany especially recorded a significantly worse export performance than NEI sectors, both at the cusp of the energy crisis and in the subsequent period due to still elevated energy prices (Giglioli and Giordano, 2023; Allione, Federico and Giordano, 2024).
[24] CEPII-BACI foreign trade data are currently available until 2023. HS2 product-level data are here employed and then aggregated up to product groups that are similar, but not entirely overlapping, with the NACE sectors employed in Figure 2. The CEPII-BACI dataset is here employed as it covers all exporting countries and is balanced between exports and imports in order to eliminate discrepancies in mirror statistics and to impute missing data, which are instead present in for example the Trade Data Monitor (TDM) dataset. Moreover, CEPII-BACI provides consistent series even over long time periods: the HS96 classification of products is herein used, so as to cover the whole period since 2000 without classification changes. Since CEPII-BACI is the most complete dataset available and covers long time-spans consistently, it is particularly congenial to the estimation of Balassa indices over a 25-year time period, despite it being less timely. In this paper we therefore employ both CEPII-BACI and TDM data, according to the purpose of the exercise.

Both the EI and NEI sectors cluster heterogeneous products, which we disentangle in Figure A4 in the Annex. In particular, the EU registered a strong and increasing comparative advantage in pharmaceuticals (which was also one of the fastest growing sectors since 2012), together with pronounced specialization in means of transport[25] and machinery, whereas the competitiveness of the (EI) chemical industry has gradually deteriorated. The EU structurally maintains a significant disadvantage in world markets as regards electronics, rubber, plastics and non-metallic minerals, and, to a lesser extent, fashion. Given the increasing weight of several of the latter goods in world trade, the EU's recent weakening goods export performance is thus also being affected by sectoral composition.

2.2.2 Critical import dependencies

An analysis of the EU's dependence from the rest of the world also requires analysing import flows.[26] Import patterns and sourcing strategies are currently shifting world-wide. Indeed, as reported in Conteduca et al. (2024), over the past few years a Western (US-centric) country bloc and an Eastern (China-centric) bloc have become more self-reliant in terms of goods import sourcing. The recent reduction in the West's imports share from the East bloc has been driven by the sharp drop in US imports from China following the US-China trade war beginning in 2018, as well as by the drop in EU imports from Russia following the Russian invasion of Ukraine and subsequent sanctions introduced by the international community.[27] While the decoupling between Russia and the West is nearly complete and largely focused on energy goods, the reconfiguration of trade *vis-à-vis* China of both the US and the EU is ongoing, albeit limited to selected product categories. In particular, the import share of advanced technology products (ATP)[28] from China – which for the US began to decline when the US-China trade war began in 2018 – started to fall also for the EU after the 2021 peak reached during COVID-19 (Figure 7); in the first ten months of 2024 it was below pre-pandemic values. As concerns products that are key for the green transition (e.g., lithium batteries, electric vehicles, and photovoltaic cells),[29] EU dependencies from China are instead extremely high, and about three times higher than those of the US, despite the mild decline in 2024 according to preliminary data. This is due to the fact that manufacturing capacity for clean technologies and materials is highly concentrated geographically, with China being the largest single producer in all stages of supply chains, from the extraction and refining of raw materials to the manufacturing of

[25] The EU's comparative advantage in the automotive sector, which in 2023 was boosted also by the loosening of the 2021-22 global supply bottlenecks discussed in Section 2.1, is expected to have declined the following year, due in particular to rising Chinese exports of electric vehicles.

[26] We focus solely on goods imports, given their significantly higher weight in external trade..

[27] The overall drop in the East's imports share from the opposite bloc has been due mainly to a reduction in China's imports from Asian countries aligned with the West bloc (namely South Korea, Taiwan, and Japan) and by the drop in Russian imports from the EU.

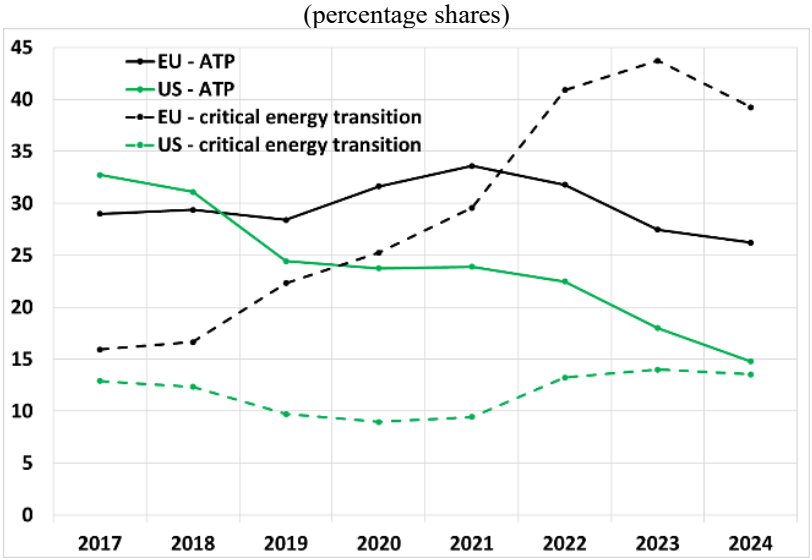
[28] The classification of ATP, put forward by the US Census Bureau, includes biotechnology, life science, opto-electronics, information and communication, flexible manufacturing, advanced materials, aerospace, weapons and nuclear technology. Given their differing trends, we however exclude from this classification four products which fall in the "critical goods for energy transition" category, namely: 381800 - Chemical elements; doped for use in electronics, in the form of discs, wafers or similar forms; chemical compounds doped for use in electronics; 853400 - Circuits; printed; 854140 - Electrical apparatus; photosensitive, including photovoltaic cells, whether or not assembled in modules or made up into panels, light-emitting diodes (LED); 854190 - Electrical apparatus; parts for diodes, transistors and similar semi-conductor devices and photosensitive semiconductor devices.

[29] The classification of critical goods for the energy transition is taken from Attinasi and Mancini (2024). It considers the products included in the Inflation Reduction Act by the US Administration (e.g., electric vehicles, electric batteries, and rare earth elements), as well as other items highlighted by the European Commission as critical, including raw minerals.

those technologies, their components and the materials required as inputs (see Figures A5 and A6 in the Annex, and for a specific focus on critical raw materials, see Box 6).

Figure 7 – Import dependency from China

(percentage shares)



Source: update of Conteduca et al. (2024) on Trade Data Monitor.
Notes: Imports are net of energy and non-monetary gold. ATP and critical goods for the energy transition are defined in the main text. 2024 refers to the first ten months of 2024. The EU shares only consider extra-EU imports.

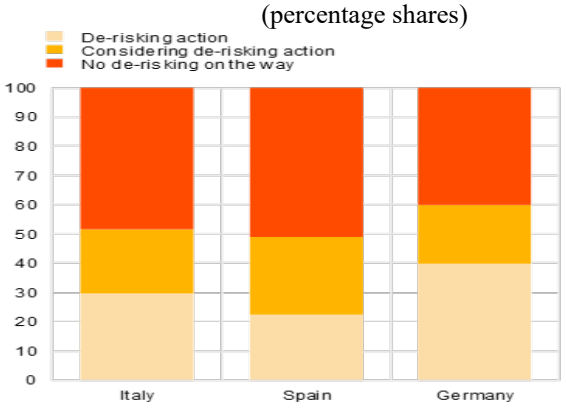
Granular survey and firm-level data point to European enterprises re-optimizing their sourcing, inventory and production strategies after the sequence of shocks since 2020. During the pandemic, firms with lower levels of inventories were less able to mitigate the impact of supply chain disruptions, thus suffering from sharper drops in both their domestic and foreign sales (Allione and Giordano, 2023; Brussevich et al., 2022; Lebastard et al., 2023; Lafrogne-Joussier et al., 2023). As a result of this, firms increased their stocks of raw materials, intermediates and finished goods as a buffer for supply chain disruptions, and expanded supplier diversification (Hassan, 2023; De Lucio et al. 2023). Moreover, surveyed firms tended to flag geopolitical risk as the main trigger of their (actual or planned) changes in input sourcing, with an increasing share favouring geographically and geopolitically closer suppliers (Attinasi et al., 2023).

Regarding critical dependencies[30] from China, according to harmonized firm surveys carried out in 2023 (Attinasi and Mancini, 2024; Bottone et al., 2024),[31] around half of the European manufacturing companies sourcing Chinese inputs deemed as critical for their activity implemented or planned to implement by the end of 2024 strategies to reduce supply-chain risk (Figure 8a).[32] Among firms that already took action, the substitution of Chinese suppliers with EU suppliers ("EU-shoring") was the most frequent de-risking strategy (Figure 8b). However, a large share of exposed companies was still neither de-risking nor considering taking action.

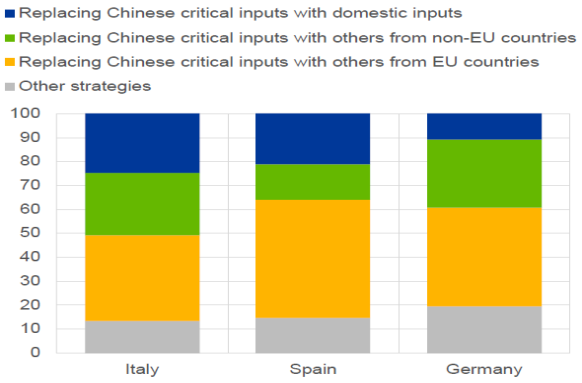
[30] Critical inputs are defined in the questionnaire as those whose shortage would lead to a reduced quality of the good or service produced, or without which a significant part of the production process would not be completed or cause considerable delays.
[31] The firm surveys are INVIND – Banca d'Italia Survey of Industrial and Service Firms, Deutsche Bundesbank BOP-F – Bundesbank Online Panel for Firms Survey and EBAE – Banco de España Business Activity Survey.
[32] Shares were even higher for German firms (60 per cent).

Figure 8 – EU manufacturing firms' de-risking from China

a) Firms relying on Chinese inputs deemed as critical for their activity, by action taken
(percentage shares)



b) Firms exposed to China and implementing de-risking strategies, by type of strategy
(percentage shares)



Source: Attinasi and Mancini (2024).
Notes: Questions: Over the past twelve months, has your enterprise purchased intermediate inputs from China that were critical to your enterprise's production processes or business activities? Has your enterprise undertaken or is your enterprise currently undertaking measures to reduce purchases of Chinese intermediate inputs?

2.3 A final wrap-up

To sum up, the EU industry – which accounts for a sizeable share of the EU's total value added – currently faces a number of challenges, evident in the decline in activity in key sectors (especially EI) and in core countries (like Germany) with broad negative spillovers within the EU. This weakness is further reflected in the recent fall of EU's goods export market shares and the deterioration in price competitiveness, also due to high input costs other than labour. In the medium term, external competitiveness of the EU industry is at risk. Whereas the EU is successfully specialized in some high-growing sectors, such as the pharmaceutical industry, it is not competitive in world markets for other strategic products, such as energy, raw materials, metal products and electronics, which are all key for the twin transition. The EU is thus currently vulnerable to trade fragmentation pressures and to trade policy uncertainty, because of its strong dependence both on extra-EU external demand and on imported critical inputs (Panetta, 2024a; 2024b; 2025).

On the one hand, also in the light of possible increasing US and subsequent tit-for-tat tariffs, fostering a single market and boosting internal demand within the EU as well as intra-EU trade (which is currently weak) could counteract dependence on external markets and trade uncertainty; key to this strategy is to focus on enhancing innovation and productivity within the EU, rather than to rely on wage compression (Draghi, 2024). On the other hand, despite survey evidence of some European firms spontaneously building stock buffers and de-risking specifically from China for the sourcing of critical inputs, strategic production interdependencies remain significant and need to be addressed by appropriate policy measures. In order to achieve supply chain resilience and economic security, EU policies should aim at strengthening global value chains, boosting domestic supply capabilities – in order to increase the ability of EU consumers to substitute away from imports toward domestic production – and promoting stable partnerships with like-minded countries that supply strategic raw

materials.[33] Furthermore, enhancing R&D activity and innovation within the EU would lead to product development of alternative technologies and materials, as well as to new options for recycling existing critical goods to promote a circular economy.

In the following sections we take stock of the recent EU industrial policy measures, discussing the underlying strategy and the institutional framework in the light of the described macroeconomic context.

3 The objectives and the instruments of EU industrial policy

According to EU Treaties, industrial policy belongs to the category of supporting competences (Articles 6 and 173 TFEU). The EU can intervene to support, coordinate or complement actions of the Member States, and legally binding EU acts must not require the harmonisation of the laws or regulations of Member States. While most industrial policy instruments remain mainly within the national domain, the EU's role has increased over time through the adoption of various initiatives aimed at stimulating innovation and spurring strategic sectors.

While delving into the history of industrial policy in Europe goes beyond the scope of this paper, it is worth shedding light on how the EU approach evolved since its foundation (see Box 1). This allows us to detect some leitmotifs (the role of innovation policies, the scope of sectoral initiatives, the interaction between national and supra-national policy makers) in the past debate that are still central today.

Box 1. The evolution of industrial policy in the EU

After World War II industrial policies in Europe were largely deployed at national level, playing a key role in the reconstruction process, with a focus on strategic industries including coal, steel, electricity and railways, often with the goal of creating national champions. The first attempt to introduce a more cooperative approach across Member States occurred in the late Sixties and early Seventies with the creation of the position of Commissioner responsible for industry, at the beginning filled by Guido Colonna di Paliano and Altiero Spinelli. A key early Commission document on industrial policy, the Colonna Memorandum[34] of 1970, warned about the surge of US direct investment in Europe, especially in high-technology industries, and underscored the risk that European industry could end up specializing in traditional sectors, compounding the technological gap with the US. To prevent this scenario, the Memorandum put forward three main recommendations: first, a strengthening of the cooperation in research and development (R&D) policies; second, the adoption of incentives for the development of innovative sectors; third, the acceleration of restructuring operations to achieve a greater market concentration in strategic sectors. These proposals did not go a long way owing to the reluctance of Member States to share their competence in the field of industrial policy (Owen, 2012).

As of the Eighties, in line with the Washington consensus and the emphasis on market-oriented policies, the scope of industrial policies also in the EU was limited to horizontal measures, aimed at

[33] A pre-requisite for these policies is the measurement and monitoring of import dependencies. The Commission indeed currently carries out a criticality assessment at EU level on a wide range of raw materials every three years, led by DG GROW (on this, see also Box 6).
[34] Commission Memorandum (COM(70) 100), "The Community's industrial policy", Brussels, 18 March 1970.

improving the business environment across sectors. By contrast, vertical policies became old-fashioned, as they were considered inefficient and subject to capture risks from large firms (Tagliapietra and Veugelers, 2020). They were also deemed detrimental to the development of the Single Market which was among the main objectives of the Single European Act of 1986. Since then, the Commission acquired a strong role in the completion of the Single Market through the enforcement of competition and State Aid regulation, *de facto* limiting the scope of sectoral policies; the Act also created the conditions for a strengthened role of the State in the area of R&D policies. The Lisbon agenda adopted in 2000, which aimed to make the EU "the most competitive and dynamic knowledge-based economy" posed much emphasis on R&D policies and structural reforms, with no reference to strategic sectors. According to Seidl and Schmitz (2023), it is only over the last decade that industrial policies aimed at supporting strategic sectors and steering markets toward longer-term purposes returned to the top of the EU's agenda, under the banner of strategic autonomy and technological sovereignty. In the early 2010s concerns about the laggard status of European industry in key growth areas such as batteries and microchips pushed the Commission to introduce the "Important Projects of Common European Interest", allowing Member States to collaborate on common projects in strategic sectors. This move marks a shift towards a more sector-driven, mission-oriented, and less horizontal European industrial policy (Di Carlo and Schmitz, 2023). This shift towards a more vertical approach also reflects the evolution of the debate on the goals of industrial policies; in particular, a large number of studies have rehabilitated the role of sectoral policies (e.g. Mazzucato, 2013; Lane, 2022; Juhász et al., 2023).

The last decade saw a global shift towards policies aimed at steering markets to achieve strategic goals. One rationale of industrial policy became to mitigate strategic dependencies (Jansen and Devroe, 2022) with a focus on critical technologies for the twin transition. In this regard, the Commission identified five areas of strategic dependencies (rare earths and magnesium, chemicals, solar panels, cybersecurity, and IT software) which industrial policy should focus on to minimize supply risks (see Section 2) and enhance economic resilience. Other factors that moulded EU industrial policy were the technological gap relative to the US and China, national security concerns (Ciuriak, 2023), and economic threats posed by third countries using protectionist policies (Mariotti, 2024b).

In the EU the new phase of public support to innovation and to the twin transition was initiated with the presentation at the end of 2019 of the European Green Deal,[35] conceived as "*a new growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy*". Consequently, the Commission has progressively deviated from its traditional market-based approach towards a more assertive role, by both tweaking the State Aid framework and directly playing a leading role in the promotion and the design of sectoral policies.[36]

[35] Commission Communication, COM(2019) 640 final, Brussels, 11 December 2019.

[36] This change in the approach to industrial policy is not unprecedented. A previous, significant shift in EU's industrial and competition policies occurred with the response to the Great Financial Crisis of 2007-08. As the crisis unfolded, it became clear that national Treasuries were the only institutions able to provide support to the financial sector and improve the resilience of the economy as a whole. Consequently, in October 2008 the Commission published a Communication

EU industrial policy includes both financial incentives and legal provisions and relies on various instruments – combined with national State Aid – to implement the specific initiatives, such as those supporting strategic sectors (semiconductors, critical raw materials, clean technologies, and defence; Table 1). The remainder of this section aims at illustrating the instruments deployed over time to support the EU industry, distinguishing between national State Aid and EU instruments, whereas EU sectoral initiatives are analysed in Section 4.

Table 1. Key industrial policy instruments and initiatives in the EU

Member States	**European Union**	
Instrument	*Instruments*	*Initiatives*
State Aid*	Horizon Europe	Chips Act
	Important Projects of Common European Interest	Green Deal Industrial Plan (Critical Raw Materials Act + Net-Zero Industry Act + Reform of electricity market design)
	InvestEU	
	Strategic Technologies for Europe Platform	
	Innovation Fund	Defence Industrial Strategy
	Digital Europe	

Note: *includes national measures implementing the State Aid temporary frameworks approved since 2020.

A completely new approach was adopted in setting up the Next Generation EU (NGEU) plan, the major pandemic response of the EU, which combines reforms and investment in Member States and is funded by a joint issuance of bonds (see Box 2).

Box 2. Next Generation EU

The Next Generation EU (NGEU) plan, introduced in July 2020, for which the EU currently expects to raise up to EUR 712 bln (out of a maximum programme envelope of EUR 807 bln) by 2026, combines several sources of funding. The funds, mainly collected via the Recovery and Resilience Facility,[37] are distributed by the Commission to Member States in the form of loans and grants and allocated to six areas of focus (green transition, digital transformation, social infrastructure and services, education and training, research and development, and enhancement of healthcare services). The twin transition is at the heart of NGEU: States must ensure that a minimum percentage of 37 per cent of interventions are allocated to green transition and 20 per cent to digital transformation.

Part of the resources provided by NGEU have indeed been used by Member States to support the twin transition of their enterprises by financing State Aid measures, as well as EU industrial policy

de facto exempting the financial sector from the State Aid regulation (Commission Communication 2008/C 270/02 allowed Member States to issue public guarantee on bank's liabilities, recapitalize financial institutions in distress, and provide public funds in a controlled winding-up of financial institutions). The exemption was withdrawn in 2013, but the path was open and when new shocks and new risks materialized, it was evident that the State Aid regime could be used as a tool to tackle and mitigate them.

[37] The other funds are made available by several EU programmes, such as ReactEU (around EUR 50 bln) and the Just Transition Fund (around 10 bln).

instruments.[38] In addition to the support measures under the Temporary Crisis Framework, in May 2022 the Commission approved the REPowerEU plan (the strategy to reduce energy dependency from Russia and accelerate the green transition) and in early 2023 the Green Deal Industrial Plan for the Net-Zero Age.[39] These initiatives, partially funded by NGEU, are implemented either in the national Recovery and Resilience Plans approved by Member States in accordance with NGEU or in sectoral initiatives such as those discussed in Section 4.

All the actions each country intends to take are described in a national Recovery and Resilience Plan. These plans include not only investments, but also reform projects that are considered key to allow the positive effects of investment on growth to fully unfold. NGEU thus entails two main changes with regard to public intervention. On the one hand, it ushers in a new season of public investment aimed at financing infrastructure projects and helping firms to adapt their production processes to the twin transition. On the other hand, NGEU also induces changes to the governance of rule-making and public investment within Member States, without however resorting to a Treaty revision (Lupo, 2023): according to a strict conditionality approach, Member States agree the deadlines for approval of reforms and investment and the indicators for verifying the achievement of the planned objectives with the Commission.

3.1 National support under the evolving State Aid regulation

The implementation of an effective EU industrial policy requires collaboration with Member States and the combination of EU and national instruments. This is notably true in the field of State Aid, which is financed by national resources and encompasses many incentive measures adopted in the region over the last years. Since the COVID-19 crisis the Commission has adopted a more flexible approach to allow Member States to support their enterprises and countries have widely used this possibility, more recently also to support EU industrial policy initiatives.

In more detail, at the onset of the pandemic, the Commission adopted the COVID Temporary Framework by which Member States were granted wider margins of flexibility than before. It was amended several times before being replaced in 2022 by the Temporary Crisis Framework, which also contained measures specifically aimed at supporting firms in the context of rising energy prices following the Russian invasion of Ukraine; it was later enhanced and renamed Temporary Crisis and Transition Framework in 2023.

While initially the temporary frameworks only included measures aimed at enhancing the financial resilience of businesses (e.g., direct aid, loans, guarantees), the Temporary Crisis and Transition Framework marked a significant change, since it provides aid specifically to foster the green and digital transition. In particular, in its current version, most recently amended on 2nd May 2024, it relaxes the constraints on States in granting aid aimed at: (i) accelerating the rollout of renewable energy and energy storage relevant for REPowerEU; (ii) the decarbonization of industrial production processes through electrification, renewable sources, and energy efficiency measures;

[38] In particular, Horizon Europe benefits from a contribution from NGEU of EUR 5.0 bln (out of EUR 95.5 billion for the period 2021-27) and InvestEU of 5.6 bln (out of EUR 26.2 bln), as will be discussed in Section 3.2.
[39] Commission Communication, COM(2023) 62 final, Brussels, 1 February 2023.

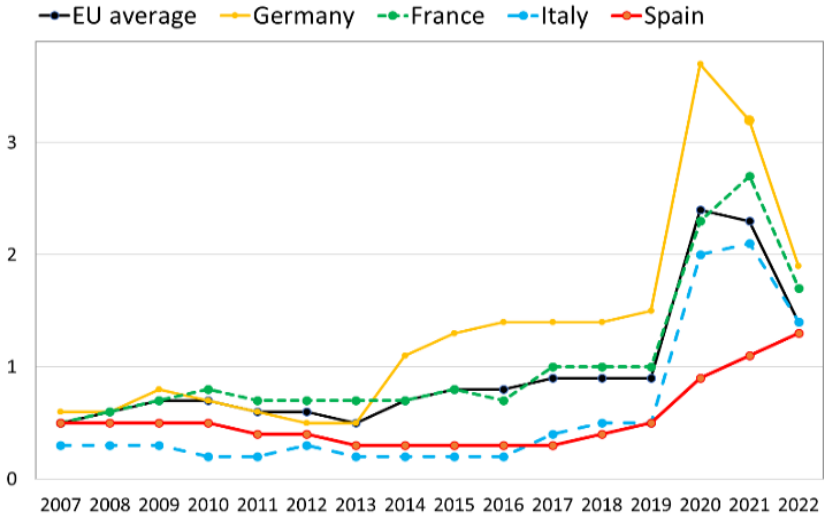
(iii) the additional reduction of electricity consumption, and (iv) higher investment in strategic sectors for the transition toward a net-zero economy.

The temporary frameworks have been abundantly used in the past four years by Member States. According to the Commission, more than 900 aid measures have been authorized under the COVID Temporary Framework alone. In 2022 (latest data available), aid granted under the Temporary Framework led to a doubling of authorised State Aid compared to pre-Covid values, bringing the total to EUR 228 bln (1.43 per cent of EU GDP).

After the pandemic, the amount of aid authorised increased in all EU countries, yet with significant country heterogeneity (Figure 9). Among the main economies, France and Germany reported a larger increase than Italy and Spain. Historically, States with greater fiscal capacity have been able to grant more aid, while those that have had to pursue restrictive fiscal policies have been able to grant less (Figure 10a). However, as a result of the temporary frameworks, the suspension of the Stability and Growth Pact in March 2020 and, later, the availability of NGEU funds, even States with limited fiscal capacity such as Greece were able to grant higher levels of aid (Figure 10b).

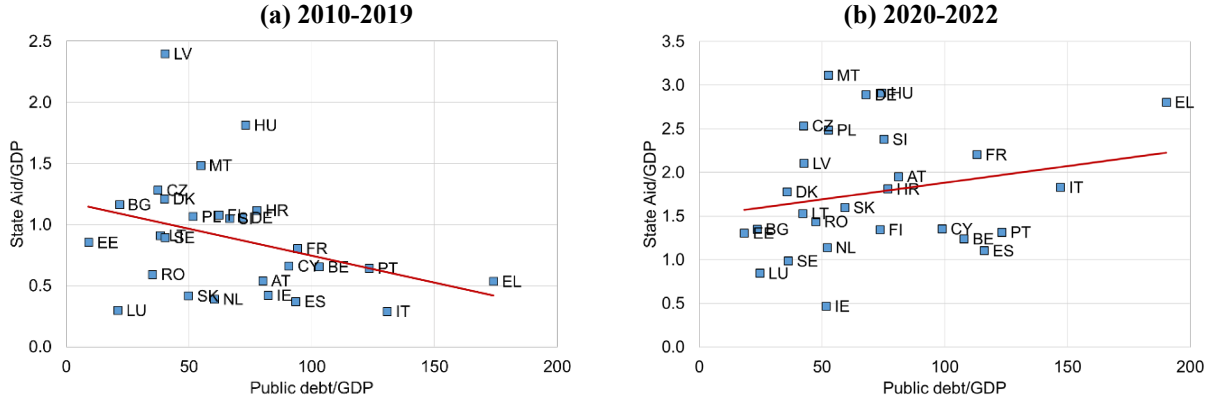
Figure 9 – State Aid in EU countries

(percentages of GDP)



Source: European Commission and Eurostat.

Figure 10 – State Aid and public debt



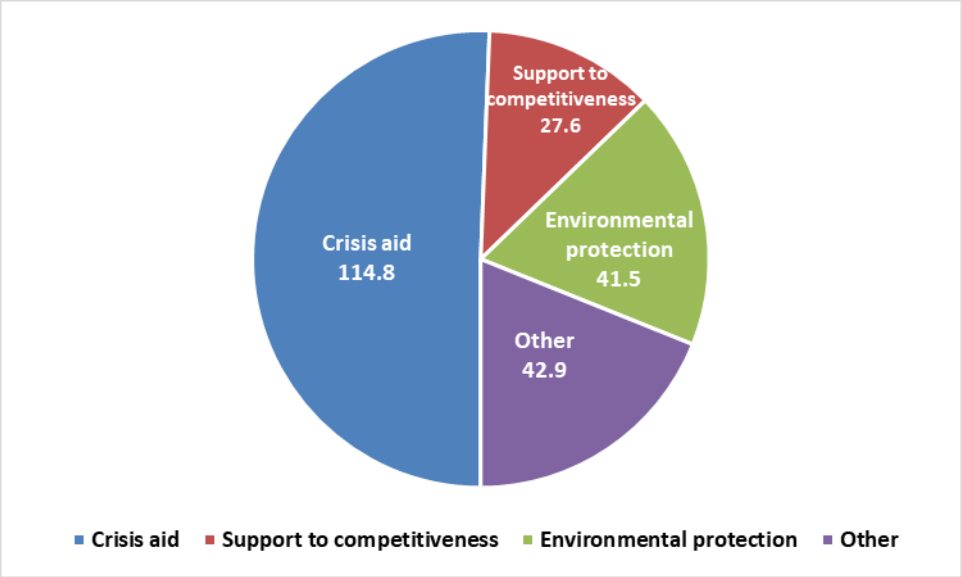
Source: European Commission and Eurostat.
Notes: The line is the interpolation line estimated by simple linear regression. Each square represents a Member State.

State Aid pursues different objectives and can be granted in many forms. The composition of State Aid has evolved under both these aspects in correspondence with the COVID-19 crisis.

More than half of the amount of State Aid after 2020 corresponds to 'crisis aid' granted in accordance with the temporary frameworks (under the 'serious disturbance in the economy' provision of the Treaty on the Functioning of the European Union, while the remainder corresponds to non-crisis aid, in line with previous years. Indeed, even if available data do not accurately reflect the measures adopted by the Commission since 2020 and do not allow a granular analysis,[40] in the period 2020-22 the main objective in the EU became dealing with 'serious disturbance in the economy' (i.e. crisis aid; see also Figure A7 a and b, in the Annex). Non-crisis related State Aid continued to be spread across a wide range of objectives. Member States show an even higher fragmentation of objectives, with the exception of Germany, which was already significantly targeting environmental protection before 2020 (Figure A7c). Strong cross-country heterogeneity across objectives is also confirmed.

Figure 11 – State Aid in the EU by objective in 2022

(EUR bln)



Source: Authors' calculations on European Commission data.
Notes: Total aid in current prices. 'Crisis aid' corresponds to the aid reported in the State Aid Scoreboard under the label 'serious disturbance of the economy'. 'Support to competitiveness' includes those labelled as 'closure aid', 'promotion of export and internationalisation', 'rescue and restructuring', 'research, development and innovation', 'structural development', 'SMEs including risk capital'; 'environmental protection' corresponds to aid labelled as 'environmental protection, including energy savings'; 'other' includes aid labelled as 'culture development and conservation', 'employment', 'social support to individual consumers', 'training', 'agriculture, forestry and rural areas', 'fisheries and aquaculture', 'compensation for damages caused by natural disaster', 'promotion of the execution of IPCEIs' and 'other'.

Among non-crisis aid, we define industrial-policy oriented State Aid as aid aimed at supporting competitiveness, namely 'closure aid', 'promotion of export and internationalisation', 'rescue and restructuring', 'research, development and innovation', 'structural development', 'SMEs including risk capital', as well as aid for environmental protection (Figure 11). According to our estimates, in

[40] Indeed, it is not possible to identify more precisely which objectives are pursued by crisis-related aid (all labelled under the "serious disturbance to the economy") and data are not available after 2022. More in general, State Aid objectives in the European Commission's Scoreboard does not perfectly reflect all the policies pursued via State Aid.

2022 industrial policy-oriented State Aid amounted to EUR 70 bln, i.e. 0.44 per cent of the EU GDP out of the afore-mentioned 1.43 per cent of EU GDP of total State Aid.

As concerns State Aid instruments, in 2010-19 direct grants, including interest rate subsidies, were clearly predominant (Figure A8 in the Annex). In 2020-22 we observe a more balanced composition of these instruments, with an increased use of guarantee, loans and equity.

Finally, in March 2023 the Commission revised the General Block Exemption Regulation (GBER) in order to support the green and digital transition.[41] According to the GBER, the Commission declares specific categories of State Aid compatible with the Treaty if they fulfil certain conditions, thus exempting them from prior notification and approval. As a consequence, the Commission *de facto* relaxed the screening on State Aid for the twin transition (EU Court of Auditors, 2024). Further regulation to enhance the role of State Aid for the twin transition is expected by the summer 2025 under the Clean Industry State Aid Framework that the Commission has announced in the Clean Industrial Deal.[42]

3.2 EU policy instruments

Most EU industrial policy initiatives, which are generally co-financed by Member States in compliance with State Aid regulation, rely on six main instruments namely (*i*) Horizon Europe; (*ii*) the Important Projects of Common European Interest; (*iii*) InvestEU; (*iv*) the Strategic Technologies for Europe Platform; (*v*) the Innovation Fund; and (*vi*) Digital Europe.

3.2.1 Horizon Europe

Horizon Europe (HE) is the main EU funding programme for research and innovation, with an endowment of EUR 95.5 bln financed by the Multiannual Financial Framework (MFF) for the period 2021-27. It provides financial support to collaborative research projects among Member States, with the aim of boosting EU competitiveness and fostering the twin transition. It consists of three pillars, i.e. 'Excellent Science', 'Global Challenges and European Industrial Competitiveness', and 'Innovative Europe', and one cross-pillar part on 'Widening Participation and Strengthening the European Research Area'. More than half of the resources of HE is assigned to the second pillar, one fourth to the first, and almost all of the remainder to the third pillar.

Each pillar comprises several programmes that have specific objectives and are earmarked to selected sectors. Not all these programmes are industrial-policy related. For the latter, we only consider HE programmes that are strictly related to industry, digitalization and climate change, and we exclude those focusing on health and social infrastructures. Overall, we estimate that about 69 bln are earmarked to industrial policy initiatives.

[41] Commission Regulation (EU) 2023/1315 of 23 June 2023, amending Regulation (EU) No 651/2014.

[42] The Commission launched a consultation on the draft communication regarding the "Framework for State Aid measures to support the Clean Industrial Deal (Clean Industrial Deal State Aid Framework)" on 11th March 2025. The relevance of State Aid for the green transition is also testified by the new mechanism, currently under discussion, which allows members of the public to request a Commission review of certain State Aid decisions to establish whether they contravene EU environmental law (amendments to the State aid Implementing Regulation (EC) No 794/2004 and to the State aid Best Practices Code with respect to new rules on access to justice following the Aarhus Convention Compliance Committee's findings in case ACCC/C/2015/128).

Within this envelope, the following HE support schemes are key in the financing of R&D initiatives:

1. the European Research Council, with a budget of EUR 16 bln, which funds frontier research through grants;
2. the European Innovation Council, which brings together companies, academia, and research labs, with a budget of around EUR 10 bln, and provides grants and/or equity investment to help companies expand beyond European borders;
3. the European Institute of Innovation and Technology with a budget of EUR 2.9 bln, which supports the development of pan-European partnerships among firms, research labs and universities to find solutions to global challenges, such as digitalisation, healthcare and climate change issues.

3.2.2 Important Projects of Common European Interest (IPCEIs)

The IPCEIs, introduced in 2014 and reviewed in 2021, are another instrument to fund research and innovation. They aim at developing the capabilities that the EU currently lacks and enhance its resilience in the event of supply chain shocks. IPCEIs allow Member States to disburse State Aid to pursue large-scale cross-border projects that make a clear contribution to the EU strategic objectives, by addressing important market failures in strategic EU value chains (Art. 107(3)(b) TFEU). Acting as a coordination device between Member States and private enterprises, IPCEIs mitigate the issue of underinvestment in R&D stemming from its public-good nature. IPCEIs focus on the pre-industrialization stages of production, ranging from research, development and innovation to first industrial deployment (hence excluding mass production).[43] As for other EU investment facilities, the Commission plays an important role in the definition of the regulatory framework and the approval of investment projects, whereas Member States are the main financiers.

Since 2018 the Commission has approved ten IPCEIs, for a combined amount of EUR 37.2 bln in State Aid, which is expected to generate almost twice as much in private investment (EUR 66 bln; Table 2). Current ICPEIs can be grouped into five strands: the hydrogen value chain (4 IPCEIs; Total State Aid: EUR 18.9 bln), microelectronics values chain (2 IPCEIs, Total State Aid: EUR 10 bln), batteries value chain (2 IPCEIs, Total State Aid: EUR 6.1 bln), cloud and edge computing (1 IPCEI, State Aid: EUR 1.2 bln), and health value chain (1 IPCEI, Total State Aid: EUR 1 bln). In total the IPCEIs involve 22 EU Member States (only France and Italy participate in all of them), one includes also the UK, and another Norway. The number of participating firms is 247 (36 of which participate in more than one IPCEI).

NGEU and RepowerEU marked a significant shift in the approach to funding of IPCEIs. Consequently, the first and the second Hydrogen IPCEIs, the second IPCEI on Microelectronics and Communication Technologies and the IPCEI on Next Generation Cloud Infrastructure and Services allow Member States to (partly) fund their projects through the Recovery Resilience Facility, instead of by using national resources. According to Eisl (2022), this mechanism provided for more than a half of the funding.

[43] The rationale for this limited focus derives from competition concerns and the threat of market power stemming from innovation.

Table 2. Approved IPCEIs: public and private investment and participating countries

	Year	State Aid (EUR bln)	Private investment (EUR bln)	Participating Countries
1st IPCEI on Microelectronics	2018	1.9	6.5	Austria, France, Germany, Italy, United Kingdom
1st IPCEI on Batteries	2019	3.2	5.0	Belgium, Finland, France, Germany, Italy, Poland, Sweden
2nd IPCEI on Batteries	2021	2.9	9.0	Austria, Belgium, Croatia, Finland, France, Germany, Greece, Italy, Poland, Slovakia, Spain, Sweden
1st Hydrogen IPCEI	2022	5.4	8.8	Austria, Belgium, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Italy, Netherlands, Poland, Portugal, Slovakia, Spain
2nd Hydrogen IPCEI	2022	5.2	7.0	Austria, Belgium, Denmark, Finland, France, Greece, Italy, Netherlands, Poland, Portugal, Slovakia, Spain, Sweden
2nd IPCEI on Microelectronics and Communication Technologies	2023	8.1	13.7	Austria, Czechia, Finland, France, Germany, Greece, Ireland, Italy, Malta, Netherlands, Poland, Romania, Slovakia, Spain, Norway
IPCEI on Next Generation Cloud Infrastructure and Services	2023	1.2	1.4	France, Germany, Hungary, Italy, the Netherlands, Poland, Spain
3rd Hydrogen IPCEI	2024	6.9	5.4	France, Germany, Italy, Netherlands, Poland, Portugal, Slovakia
4th Hydrogen IPCEI	2024	1.4	3.3	Estonia, France, Germany, Italy, Netherlands, Slovakia, Spain
IPCEI on Med4Care	2024	1.0	5.9	Belgium, France, Hungary, Italy, Slovakia, Spain
Total		**37.2**	**66.0**	**22 Member States and United Kingdom and Norway**

Source: European Commission.

A similar initiative to IPCEIs, although with a lighter structure and much smaller amounts of subsidies, are Industrial Alliances (Box 3).

Box 3. Industrial Alliances

Industrial Alliances are informal cooperation and information networks comprising firms, public authorities at EU, national and regional levels, and other stakeholders (such as NGOs, industry and trade unions, and research institutions; Bencivelli et al., 2022).[44] Industrial Alliances aim at fostering cooperation in investment projects to support the development of key technologies and areas such as batteries, circular plastics, microprocessors, hydrogen, and critical raw materials (Table). They must be inclusive and open to small and medium-sized enterprises (SMEs) as they represent the

[44] Membership in Industrial Alliances displays high heterogeneity across countries. Italian entities' participation also varies significantly, ranging from about 13 per cent for the alliance on small modular reactors to about 3 per cent in the one on critical medicines.

most vulnerable firms of the EU's industrial system to foreign shocks and to the strategic use of interdependencies by third countries (Attinasi and Mancini, 2024). Alliances are open to the participation of both public and private financial institutions (such as the European Investment Bank, EIB, the European Bank for Reconstruction and Development, EBRD, and banks) and may also extend their membership to involve entities in third countries.

Table. Industrial Alliances

	year	number of participants
European Battery Alliance	2017	440
Circular Plastics Alliance	2018	336
European Raw Materials Alliance	2020	699
European Clean Hydrogen Alliance	2020	1,687
European Alliance for Industrial Data, Edge and Cloud	2021	57
Alliance for Zero-Emission Aviation	2022	190
European Solar Photovoltaic Industry Alliance	2022	141
Renewable and Low-Carbon Fuels Value Chain Industrial Alliance	2022	298
Industrial Alliance on Processors and Semiconductor Technologies	2024	n.a.
European Industrial Alliance on SMRs	2024	226
Critical Medicines Alliance	2024	136

Source: European Commission.
Notes: n.a. = not available. The number of participants refers to the latest available date.

3.2.3 InvestEU

The Commission assigns a key role to the EIB to fill the huge EU investment gap especially for high-risk projects, given the limited size of the EU budget (Mertens et al., 2023). In particular, the EIB is tasked to implement the EU budget guarantee (EUR 26.2 bln) provided through the InvestEU Fund, which aims at supporting private and public investment with a focus on the green and digital transition and the resilience of supply chains. The guarantee may be used to absorb first losses in high-risk investment projects in order to crowd-in private investors. This EU budget guarantee supports strategic investments across four policy areas: *i)* sustainable infrastructure (EUR 9.9 bln), which includes renewable energy, digital connectivity, sustainable transport modes; *ii)* research, innovation and digitization (6.6 bln), covering product development, transfer of technologies to the market; *iii)* small and medium-sized businesses (6.9 bln), with the aim to finance start-ups and high-risk companies. There are also 2.8 bln for social investment and skills, which we do not take into account for the computation of EU resources available for industrial policy initiatives.

The guarantee available under the InvestEU Fund is implemented in partnership with the National Promotional Banks (NPBs) of Member States (so-called "implementing partners" [45]), which provided their own contributions bringing the total amount of EU guarantee available to EUR 30.5 billion of euro, of which almost 80 per cent has already been approved. billion. The leverage realised

[45] NPBs are legal entities carrying out financial activities that are given a mandate by a Member State to foster development or promotional activities; Commission Communication COM(2015) 361 final), Brussels, 22 July 2015.

so far is high (15 times), and the investment already mobilised amounts to 218 bln, of which 65 per cent from private sources.[46]

Additionally, the EIB supports the European Green Deal through its direct lending as it pledged to allocate half of its annual lending to climate finance (EUR 35 bln a year). In 2019 the EIB, together with the five largest NPBs[47] launched the Joint Initiative on Circular Economy (JICE) to support development and implementation of circular economy projects in the EU. It provides loans, equity investment or guarantees to eligible projects, including research and innovation projects and develop innovative financing structures for public and private infrastructure, municipalities, and private firms. Projects span all stages of the value chain and the life cycle of products and services, from design to value recovery. JICE goes beyond the standard cooperation between the EIB and NPBs where the latter usually channel EIB funding in their respective economies. The initial financing envelope was EUR 10 bln of investments over five years. Yet already in 2023 JICE reached 11.6 bln in financing and the following year it was enlarged to another NPB[48] and extended to reach 16 bln in financing by 2025.

3.2.4 Strategic Technologies for Europe Platform (STEP)

Another recent EU industrial initiative is the STEP, which aims at boosting investment in critical technologies, strengthening their respective value chains. Also in this case, the Commission is tasked to define the regulatory framework for investment projects and coordinate the different actors involved in their financing. The STEP regulation specifies that technologies are qualified as critical if they bring to the internal market an innovative, emerging, and cutting-edge element with significant economic potential, or they contribute to reducing or preventing the strategic dependencies of the EU.[49] The technologies envisaged are those related to digital innovation (microelectronics, computing, artificial intelligence, cybersecurity, robotics), green energy (renewables, heat pumps, electricity grid, etc.) and biotech; it is explicitly open to defence projects. In the perspective of strengthening the value chain of critical technologies, eligible investment projects may refer to final products, to specific components and/or machinery primarily used to produce the final products, or to critical raw materials.

Originally, the Commission had envisaged the creation of an EU Sovereignty Fund but given the lack of consensus among Member States on the option to finance it through common debt following the example of the NGEU, the proposal was then scaled down and the focus put on streamlining previous programmes and existing funds (Fontana, 2024), without mobilizing additional EU financial resources. STEP uses resources across several EU funding programmes (such as Horizon Europe, Innovation fund, Digital Europe, European Defence Fund) with the objective to help individual projects benefit from cumulative funding through a single platform. The Commission directly manages STEP projects, by evaluating the submissions, providing grants, and monitoring the implementation. National authorities are allowed to contribute to funding STEP projects redirecting

[46] *Competitiveness Compass*, p. 21.
[47] Namely, Bank Gospodarstwa Krajowego (Poland), Cassa Depositi e Prestiti (Italy), Groupe Caisse des Dépôts (France), Instituto de Crédito Oficial (Spain), and Kreditanstalt für Wiederaufbau (Germany).
[48] Dutch Invest-NL (Netherlands).
[49] Commission Comunication C(2024) 3148 final. Guidance Note concerning certain provisions of Regulation (EU) 2024/795 establishing the Strategic Technologies for Europe Platform (STEP)

part of the Cohesion Policy funds[50]. To encourage this option, STEP offers financial incentives, such as a 100 per cent co-financing rate for the 2021-27 period. Moreover, the cofinancing of STEP projects allows supporting large enterprises, waiving to ordinary provisions concerning the governance of Cohesion Policy funds.[51]

3.2.5 Other instruments

The Innovation Fund, established in 2020, is financed with the revenues of EU's Emission Trading System (i.e. not through the MFF), which – according to estimates (Pinkus et al., 2024) and depending on the carbon price – can provide around EUR 40 bln of support over the 2020-30 period. It focuses on highly innovative clean technology projects, especially in EI industries, and provides support to bottom-up initiatives of limited scale. The Fund has allocated about EUR 7.2 bln to more than 120 innovative projects (of which EUR 145.7 mln for 11 projects in Italy).

With an overall budget of over EUR 8 billion within the MFF 2021-27, Digital Europe is the funding programme aimed at accelerating the digital transition, by supporting strategic projects in key areas (such as semiconductors, supercomputing, artificial intelligence), while ensuring a wide use of digital technologies. This instrument does not tackle in isolation the challenges posed by the digital transition as it complements the funding available for this objective through other EU programmes (such as HE).

A limit concerning the EU instruments described above is that they do not specifically support disruptive innovation and financing high-risk high-return investment projects. As discussed in Box 4, one of the proposals on the table is to set up a European equivalent of US Defense Advanced Research Projects Agency (DARPA; Terzi et al., 2023; Draghi, 2024).

Box 4. Towards an Advanced Research Projects Agency in the EU?

A drawback of EU industrial policy relative to innovation and research funding concerns its governance and the bias against high-risk projects that may lead to disruptive innovations and technological breakthroughs but are typically associated with a high failure rate (Draghi, 2024). Indeed, EU programmes are generally administered by Commission services, which lack the required technical competence to oversee them and tend to outsource the selection of projects to expert committees. Moreover, most of the EU subsidies for the current innovation programmes, notably through the European Innovation Council, are aimed at supporting projects that have already reached a sufficient maturity and at scaling up small and medium enterprises (Fuest, 2024).

An option to address this issue is to create an independent agency tasked to run a limited number of projects around a few policy priorities selected following a top-down approach. It would differ from existing EU research funding programmes in that it would not pursue the interests of the scientific community or the engineering needs of participating industries; its aim would instead be to promote disruptive innovations that address strategic needs (Waibel, 2019).

Building on the experience of the US DARPA, such a proposal would combine elements of mission-oriented programmes with more iterative and collaborative forms of governance (Pinkus et

[50] According to the *Competitiveness Compass,* EUR 14.7 bln have been so far redirected to STEP, 6 bln of which from national and regional cofinancing of Cohesion Policy and the rest from other EU programmes.
[51] See Carcaiso et al. (2025).

al. 2024; Defard, 2023). Indeed, a key aspect of the success of the US DARPA experience with regard to the development of some breakthrough technologies such as the Internet, Global Positioning System, and Graphical User Interface, lies in its organisational flexibility (Juhász et al., 2024). The central figure in the DARPA model is the programme director, a professional from academia or industry recruited for a 3-year term, who is tasked with selecting a portfolio of projects to support with grants. The design and the monitoring of performance milestones involves a continuous iterative collaboration between the programme director and the relevant stakeholders (researchers and firms).

3.3 A quantification of resources for industrial policy in the EU

Given the high number of EU industrial policy instruments and the variety of objectives they finance, the quantification of the EU financial resources involved is not straightforward. As seen also in Section 3.1 for State Aid, in order to uncover the actual industrial-policy related expenditure it is important to distinguish them on the basis of their objective. We thus select only the parts directly related to industrial policy and exclude the others, which are chiefly related to pure research or social and/or health objectives.

In more detail, we include parts of HE and of the EU Budget contribution to the EIB for InvestEU,[52] the whole of the Innovation Fund (EUR 40 bln) and of Digital Europe (8.2 bln), the public investment in IPCEIs (37.2 bln), and the Member States' contributions to STEP (6 bln; Table 3). We exclude EIB lending and EU funding to STEP, and do not take into account leverage effects.

Table 3. Funding of EU Instruments

Instruments	*Allocated Resources*	*Ave. Yearly Resources*
Horizon Europe (part)(1)	69.0	9.9
IPCEI	37.2	5.3
InvestEU part(1)	23.4	3.3
STEP(2)	6.0	0.9
Innovation Fund	40.0	4.0
Digital Europe	8.2	1.2
TOTAL		24.5

Notes: (1) It covers only the programmes aimed at supporting innovation and competitiveness (2) National and regional Cohesion Policy Funds that have been redirected to the funding of STEP projects,

According to our calculations, all in all the amount of resources can be estimated in almost EUR 24.5 bln a year, equal to 0.14 per cent of EU's nominal GDP in 2023 (table),[53] which is dwarfed by

[52] In particular, for HE we consider in Pillar 1 the European Research Council, in Pillar 2 the clusters 4 'Digital, Industry & Space', 5 'Climate, Energy & Mobility' and 6 'Food, Bioeconomy, Natural Resources, Agriculture & Environment', and the whole Pillar 3, totalling EUR 69 bln. For InvestEU, we include 'Sustainable infrastucture', 'Research, innovation and digitisation', and 'SMEs', for a total of EUR 23.4 bln. Moreover, we input to the EU resources both IPCEIs State Aid and the national contribution STEP, because their governance is centralised, instead of being under the control of the Member States. EU funds for STEP are instead excluded as the platform only generates a reallocation of EU existing resources, without mobilising any additional EU funding. We also exclude EU defence funding.

[53] This estimate rises to EUR 24.9 bln, i.e. 0.15 per cent, if we include EU funding for collaborative defence research projects (EUR 2.7 bln in seven years via the European Defence Fund, see section 4.4).

the amount of industrial-policy related State Aid, 70 bln, i.e. 0.44 per cent of the EU GDP (again see figure 11).

Our estimates differ from those by Pinkus et al. (2024), which takes into account only innovation-related expenditure (a subset of industrial-policy related expenditure) and thus includes a smaller part of HE, the Innovation Fund, and (a higher estimate of) the average public investment in IPCEIs. Other existing estimates of EU industrial policy expenditure are much broader and thus not strictly comparable: Landesman and Stöllinger (2020) also includes Cohesion funds, and Pellegrin et al. (2015), in addition to these, also takes into account the common agricultural policy and the maritime and fisheries policies.

Direct comparison with industrial policy expenditure in other major economies is not easy. For the US the three key industrial policy acts of the Biden Administration (the Infrastructure Investment and Jobs Act, the CHIPS and Science Act, and the Inflation Reduction Act) involve vast amounts of subsidies and investment which on average add up to a yearly expenditure of 0.69 per cent of 2023 US GDP.[54] Hence only these three federal acts (i.e. excluding any other federal and State level industrial policy intervention) directly involve resources comparable, as a share of GDP, with the sum of all Member States and EU industrial policy instruments. Moreover, the sheer volume of subsidies provided only through three acts, denotes a strong focus of US industrial policy on selected sectors and objectives as opposed to the dispersion of instruments and initiatives adopted in the EU, including those implemented at national level. As a further comparison, consider that in 2009 the US fiscal response to the Great Financial Crisis (the American Recovery and Reinvestment Act) provided for expenditure amounting to 2 per cent of GDP. Finally, there are no recent estimates of overall industrial policy expenditure in China: to the best of our knowledge the most updated figure refers to 2019 and it is 1.73 per cent of GDP (DePippo et al. 2022).

4 EU sectoral industrial policy initiatives

Moving to sectoral policies, three qualifying initiatives undertaken by the Commission are: the Chips Act, the Green Deal Industrial Plan – comprising the Net-Zero Industry Act (NZIA), the Critical Raw Materials (CRM) Act and the reform of electricity market design – and launching a strategy for the defence industry. These initiatives may also be considered as a response to policy actions taken by other major economies to accelerate the twin transition, especially the US Inflation Reduction Act (see Box 5).[55] Along the same lines, the Chips Act may be considered as the European response to the US CHIPS and Science Act.

Box 5. The US Inflation Reduction Act and the EU response

The Inflation Reduction Act (IRA) is a legislative package adopted in 2022 in the US which includes massive green subsidies for an estimated amount of USD 300 bln over ten years, aimed at lowering the cost of developing and deploying clean energy.[56] The subsidies aim at stimulating the purchase

[54] According to the analyses by the Congressional Research Services and others the three acts provide for spending USD 1494.3 bln in 10 years and additional USD 203 bln in five years.

[55] In particular, the NZIA which aims at stimulating investment in green technologies, allows Member States to grant higher support to firms when there is a real risk of investments being diverted away from Europe (the so-called 'matching aid').

[56] The actual size of these subsidies is unknown as most of them rely on tax breaks and are not capped.

of electric cars, investment in clean-tech products (such as batteries and renewable energy equipment), and the production of carbon-neutral electricity. A distinctive feature of the IRA is that a large part of the subsidies is subject to local content requirements (LCRs); for example, the USD 7,500 consumer tax credit for the purchase of electric cars applies only to vehicles assembled in the US, Canada or Mexico, reducing the cost of an eligible vehicle by 20 per cent on average. These provisions were challenged in front of the WTO by China, which stated that the IRA's subsidies favour US goods over imports, violating WTO rules prohibiting such discrimination. Another distortion stems from the introduction of LCRs for batteries and critical minerals used in electric cars. The LCRs contained in some IRA provisions may trigger protectionism on a large scale, inducing even advanced economies to retaliate in absence of a free trade agreement with the US.[57] According to Tagliapietra et al. (2023), fears that the subsidies and LCRs embedded in the IRA could entice European clean-tech firms to relocate to the US led to the adoption of Green Deal Industrial Plan, which may be considered as a defensive strategy to stimulate investment in green sectors within the EU by means of financial incentives and an *ad hoc* regulatory framework.

A common feature of these EU policies is the reliance on national subsidies to encourage private investments, while the contribution of EU financial resources is relatively limited. Due to fiscal constraints, the EU resources for industrial policy initiatives generally come from existing funds in the EU budget, without additional financial contributions.

Finally, the defence sector exhibits certain peculiarities that make it an interesting case-study for industrial policy. According to the Treaties, the Common Foreign and Security Policy and, consequently, the Common Security and Defence Policy belong to the intergovernmental sphere, and cooperation among Member States is only voluntary, limiting its impact. Additionally, EU defence policy is strictly intertwined with rights and obligations under the North Atlantic Treaty, yet two EU Member States currently do not belong to NATO (Austria and Ireland). The Commission has however decided in recent years to play a larger role in this field by supporting the development of a European defence industry.

Looking forward, in the *Competitiveness Compass*, the Commission has announced that it will step up its efforts to develop a European industrial strategy. Its key elements are: (*i*) the Clean Industry Deal to reconcile industrial development with decarbonisation objectives; (*ii*) a new simplified State Aid framework, to accelerate the roll-out of renewable energy, deploy industrial decarbonisation and ensure sufficient manufacturing capacity of clean tech; (*iii*) a review of IPCEIs, to boost innovation in strategic sectors; (*iv*) a European Competitiveness Fund, to invest in innovation and technologies; (*v*) an Industrial Decarbonisation Accelerator Act, to support European lead markets for the development, production and diffusion of clean tech in industry.[58] Also the proposal of the next MFF will take into account this strategy and present a rationalisation of funding programmes.

[57] The risks of a trade war generated by the current US administration's stance on protectionist policies further increases trade policy uncertainty.

[58] Another important feature is its stance on competition policy. According to the *Competitiveness Compass*, "[I]n the global race to develop deep technologies and breakthrough innovations, competition policy must keep pace with evolving markets and tech innovation. This needs a fresh approach, better geared to common goals and allowing companies to scale up in global markets – while always ensuring a level playing field in the Single Market".

In the following subsections we delve deeper into three sectoral policies: the CRM Act, the NZIA, the Chips Act and the European Defence Industrial Strategy.

4.1 The Critical Raw Materials Act

The CRM Act aims at mitigating the vulnerabilities of the EU associated with imports of essential materials for the green and digital transition (see Box 6). It also covers strategic sectors from a national security perspective, such as defence and aerospace. The CRM Act is a pillar of the EU strategy to enhance strategic autonomy and is part of the Green Deal Industrial Plan to scale up the EU manufacture of key carbon neutral or "net-zero" technologies.

Box 6. The EU's external dependence on critical raw materials (CRMs)

To understand the drivers of the EU strategy on CRMs, it is worth recalling the pressures on the demand side stemming from the green transition, the characteristics of the global supply and the limited role of the EU, as already discussed in Section 2.2 more generally for all strategic inputs. On the first aspect, according to the International Energy Agency, the share of renewables is expected to rise from current levels of around 10 to 60 per cent of global energy consumption by 2050, leading to a dramatic increase of the demand of CRMs. The global supply of these resources is concentrated in a handful of countries (again see Figure A5 in the Annex), in particular China which has almost the monopoly of rare earth elements, which are crucial for the wind energy and e-mobility sectors, and plays a dominant role for other critical materials, acquired by resorting to (aggressive) trade and industrial policies.[59] The strong concentration in the supply of CRMs entails that a few countries might benefit disproportionately from growing demand; it also raises the risk of supply chain disruptions associated with geopolitical tensions, as key producers of CRMs may use their dominance to weaponize trade relations. In this context, the EU is extremely vulnerable since it accounts for only 0.5 per cent of global production of CRMs and relies on third countries for most of the materials which are key to the twin transition.[60]

Table. The current list of Critical Raw Materials

2023 Critical Raw Materials (*Strategic Raw Materials in italics*)			
aluminium/bauxite	coking coal	*lithium*	phosphorus
antimony	feldspar	LREE	scandium
arsenic	fluorspar	*magnesium*	*silicon metal*
baryte	*gallium*	*manganese*	strontium
beryllium	*germanium*	*natural graphite*	tantalum
bismuth	hafnium	niobium	*titanium metal*
boron/borate	helium	*PGM*	*tungsten*
cobalt	*HREE*	phosphate rock	vanadium
		*copper**	*nickel**

* Copper and Nickel do not meet the CRM thresholds, but are included as SRMs.

Source: European Commission.

[59] For instance, China has extensively used trade restrictions like export taxes for upstream products to support domestic downstream industries (OECD, 2023). Abroad, it managed to secure exclusive access to CRMs, promoting investment through the Belt and Road Initiative (Gelpern et al., 2022); in addition, Chinese firms have gained the control of supply chains of several CRMs incorporating local firms in resource-rich countries (Leruth et al., 2022).

[60] In particular, the EU depends on imports from Russia and South Africa for palladium and platinum, which are indispensable for the development of hydrogen technology, and on imports from China for rare earth elements.

The list of materials relevant for the implementation of the CRM Act includes 34 elements, which have been identified by the Commission on the basis of two criteria, namely the economic importance and the supply risk; 17 of these elements are considered strategic due to their heightened supply risk (Table).

The EU strategy on CRMs is twofold: i) increasing domestic capacity; ii) diversifying import sources. The CRM Act seeks to scale up investment along the entire supply chain, including the recycle of CRMs. The second objective is to reduce supply risks by strengthening trade relations with resource-rich countries and enhancing international cooperation with like-minded countries, which goes in the direction of the policy measures suggested in Section 2.2.

Regarding the additional objective of increasing domestic capacity for strategic raw materials (SRMs) by 2030, the Act sets out three targets in terms of EU consumption: (*i*) 40 per cent should be covered by domestic processing; (*ii*) 10 per cent by domestic mining; (*iii*) a further 25 per cent by recycling. A further target concerns supply diversification requiring that imports from a single country do not exceed 65 per cent of the consumption of each material.

To promote domestic investment, the CRM Act sets out a common regulatory framework for Strategic Projects covering the entire value chain including mining, processing and recycling. These projects benefit from streamlined permit processes[61] and a coordinated and facilitated access to finance. For financing, the CRM Act relies on existing funds like HE and InvestEU. State Aid (in the form of public guarantees, loans, equity injections) is allowed, as long as private investments are deemed insufficient to ensure the achievement of the objectives set out by the Act.

In order to diversify CRM imports, the Act promotes a strengthening of the international cooperation with like-minded countries through the creation of the Critical Raw Materials Club encompassing resource-hungry and resource-rich countries. Another instrument is the bilateral strategic partnerships with the latter economies to expand their extraction industries. Trade and investment agreements targeting CRMs may also be concluded to help these countries move up the value chain.[62]

4.2 The Net Zero Industry Act

In the perspective of accelerating the green transition, the NZIA plays a complementary role with respect to the CRM Act, by stimulating investment in green technologies. The act sets a goal for net-zero manufacturing capacity to meet at least 40 per cent of the EU's annual deployment needs by 2030. To this end, it creates a regulatory framework – which encompasses faster permitting procedures and facilitated and coordinated access to finance – allowing for the establishment of

[61] As regards permit procedures, the total duration should be within 27 months for extraction projects and 15 months for processing and recycling projects. Streamlining permitting is one of the main policy recommendations of IEA (2024). Also the *Competitiveness Compass* foresees an extension of the accelerated permit procedures to a larger number of sectors. Specifically concerning CRMs, it envisages joint procurement.

[62] The EU may resort to trade and investment agreements with resource-rich countries, conceding them preferential treatment through Free Trade Agreements (FTAs). However, the EU applies relatively low tariffs on average, and over 90 per cent of the EU's CRM imports are exempt from tariffs, leaving little scope for further tariff reduction in partner countries.

Strategic Projects selected by Member States and approved by the Commission. The relevant sectors include solar photovoltaic, wind turbines, batteries, fuel cells, sustainable biogas and biomethane. Public funds for strategic projects are provided by Member States coherently with the Temporary Crisis and Transition Framework, discussed in Section 3.1.

In order to improve the coordination between the Commission and Member States, the act established the Net-Zero Europe Platform with the aim of improving exchange information, strengthening industrial partnerships, monitoring progress towards the objectives of the NZIA. The Net-Zero Europe Platform will also support investment by identifying financial needs, bottlenecks and best practices for projects across the EU.

Since aid for investment in clean technologies is offered in other jurisdictions like the US (see Box 5), under the NZIA Member States are allowed to grant higher support to firms when there is a real risk of investments being diverted away from Europe (so-called "matching aid").[63] Another feature of subsidies under the NZIA is that they are not limited to funding capital expenditure and may cover also operating expenditure.

The act sets new mandatory rules in matter of public procurement, so that public authorities must consider criteria (also via minimum mandatory requirements) in terms of sustainability and resilience. For instance, the resilience criterion requires public buyers to diversify supply sources in cases of high dependency. The act also allows for support schemes that incentivise households and businesses to purchase net-zero technology products.

The Clean Industrial Deal recently proposed by the Commission aims at accelerating the green transition doubling down some aspects of the NZIA. In particular, the proposal reiterates the importance of reviewing the regulation about the public procurement, by enhancing the requirements in terms of resilience and sustainability. It also dedicates particular attention to decarbonization incentives for firms. Moreover, in order to stimulate green investments, the proposal calls for a simplification of the State Aid regulation, and an enhanced synergy between the existing EU instruments (InvestEU, Innovation Fund, HE).

4.3 The Chips Act

As discussed in Section 2.1, the pandemic brought to the fore supply risks concerning semiconductors due to the strong concentration of the production and the economy-wide ripple effects given the upstream relevance of these inputs. In this field, subsidies of various kinds have been largely used for decades, mainly in Asian economies and United States. In 2023 the EU joined the other major economies adopting a Chips Act, which aims at increasing domestic production and reducing import dependence. Indeed, the EU domestic consumption of semiconductors is currently covered

[63] Not always these policies are beneficial. A notable case of unsuccess is Northvolt, a Swedish firm in the electric vehicle battery segment, which received substantial subsidies from both EU and Member States (Tagliapietra and Trasi, 2024). In 2022 the company received EUR 155 mln via the IPCEI mechanism; in 2024 the Commission approved a matching aid from Germany of 902 mln, consistently with the NZIA, as the company was being offered support to invest in US under the IRA. Northvolt was also financed by the EIB with the guarantee provided by InvestEU and its predecessor, the European Strategic Investment Fund. Despite all this support, in 2023 the company experienced production setbacks, which ultimately led to a confidence crisis among customers (including important EU carmakers) and creditors. Finally, in November 2024 it filed for Chapter 11 protection against creditors in the US and filed for bankruptcy in Sweden in March 2025.

mostly by imports and its share in the global production has fallen since the Nineties from 20 to about 10 per cent.

The EU strategy is based on three main pillars, namely stronger R&D incentives, the creation of new factories and an enhanced coordination among Member states to manage supply risks. The Chips Act seeks to mobilize over EUR 40 bln of new investment in the chip sector for both R&D policies[64] and the expansion of domestic capacity. Only a fraction of these funds comes from the EU EUR 3 bln come from the EU budget through Horizon Europe and Digital Europe; additional support is also channelled through the two IPCEIs dedicated to the microelectronics values chain (again see Table 2).

The first pillar, covering R&D policies, aims to bridge the gap between labs and firms, fostering development and training programs, and supporting SMEs and start-up. As for the second pillar, in order to expand domestic production, the act waives State Aid regulation for new factories developing innovative technologies (first-of-its-kind).[65] The third pillar is a coordination mechanism for risk monitoring and the adoption of emergency measures, like centralized procurement and the possibility for the Commission to oblige certain manufacturers to prioritize orders to supply critical sectors, subject to strict conditions and safeguards (*priority rated orders*). With regard to risk monitoring (which is conducted by the European Semiconductor Board), the act sets out information requirements for producers aimed at foreseeing supply disruptions and anticipating ripple effects for downstream sectors.

Since the adoption of Chips Act more than EUR 90 bln of new investments have been announced, most of which refer to new factories built by foreign firms, such as Intel and TSMC. While the aggregate impact seems to be positive, the distributive implications across Member states are non-negligible since most investment is concentrated in Germany.[66] This is a direct consequence of the fact that only a fraction of subsidies is financed through the EU funds.[67] Another pitfall of the Chips Act is that most investment plans in the EU remain at the announcement/potential level, and EUR 40 bln in pledged investments have been recently put on hold (Patrignani et al., 2025).

4.4 Defence industrial policy

The EU defence industry is highly concentrated in a few big companies and countries (Table 4). Airbus (a joint venture between France, Germany and Spain) is the largest defence firm and represents the most successful example of intergovernmental industrial cooperation in the EU (Terzi

[64] The Commission estimates that the Chips Act could stimulate a similar amount of autonomous investment from the private sector.
[65] "First-of-a-kind" facilities are new or substantially upgraded semiconductor manufacturing facilities providing a dimension of innovation not yet present in the EU. The Commission is competent to assess if the investment project meets the first-of-its-kind prerequisites, based on the opinion of the European Semiconductor Board, composed of representatives of the Member States and the Commission.
[66] The most important investments in Germany are those announced by Intel (USD 32 bln) and TSMC (11 bln) and Infineon (5.3 bln).
[67] Specifically, Germany, France and Italy allocated respectively about USD 21 bln, 5 bln and 4 bln.

et al., 2023).[68] However, its defence-related revenues is less than one-fifth of total revenues. The second largest player is Leonardo (Italy) and the third Thales (France).

The leading defence company in Europe, BAE Systems – whose defence turnover surpasses that of Airbus and Leonardo combined – globally just ranks seventh and moreover it no longer falls under EU's jurisdiction. In fact, BAE and Rolls Royce Holdings, both based in the UK, directly own a number of significant defence firms within the EU. Consequently, it is extremely difficult, from both an industrial and a strategic perspective, to develop an EU industrial base in the defence sector excluding the UK: this is one of the key challenges for EU policy after Brexit.

Table 4. Top 10 EU Defence Firms

EU Rank	Company	Country	2023 Defense Revenue (USD mln)	World Rank
1	Airbus	France	12,900.50	13
2	Leonardo	Italy	12,401.95	14
3	Thales	France	10,593.79	17
4	Rheinmetall AG	Germany	6,145.57	20
5	Naval Group	France	4,604.12	27
6	Saab AB	Sweden	4,377.43	29
7	Safran	France	4,325.76	30
8	KNDS	Netherlands	3,514.79	36
9	Dassault Aviation	France	3,244.32	38
10	Fincantieri S.p.A.	Italy	2,227.83	48
Memorandum items:				
-	BAE Systems§	UK	27,551.81	7
-	Rolls-Royce§	UK	5,070.16	23

Source: Aerospace and Defence Industries Association of Europe (ADS), Facts and Figures 2023. Notes: the column "Reference countries" is based on headquarters. § The two UK-headquartered companies would rank #1 and #6 when considering EU+UK together (i.e. before Brexit).

The mirror image of this fragmented industrial structure are the low levels in the EU of defence expenditure and, in particular, of defence investment expenditure. In 2023 total defence expenditure by EU Member States was at EUR 279 bln, equal to 1.6 per cent of GDP, below the NATO target of 2 per cent (EDA, 2024).[69] Defence investment was EUR 72 bln, (i.e. 26 per cent of total expenditure, higher than the 20 per cent NATO benchmark) and more than 80 per cent of it (about EUR 61 bln) was used to procure military equipment, often from non-EU manufacturers.[70] Defence investment

[68] This joint industrial policy initiative started in the 1960s and was officialised in 1967 with the declaration signed by ministers from France, Germany, and the UK, in which they agreed '*for the purpose of strengthening European co-operation in the field of aviation technology and thereby promoting economic and technological progress in Europe, to take appropriate measures for the joint development and production of an airbus*'. The current company (Airbus SE) is the product of consolidation in the European aerospace industry since 1970, culminated in 2000 with the merger of the French Aérospatiale-Matra, the German DASA and Spanish CASA.

[69] There is quite a significant cross-country variability of defence expenditure, from 0.2 per cent in Ireland to 3.3 per cent in Poland. Only nine countries spend at least 2 per cent of GDP in defence, namely Bulgaria, Denmark, Hungary, Finland, Lithuania, Greece, Latvia, Estonia and, indeed, Poland.

[70] Defence research and development, a subset of investment, received EUR 11 bln, of which only 4 bln for defence research and technology, i.e. basic research, applied research and technology demonstration for defence purposes.

expenditure has been growing since the trough in 2014, and in 2022 it compensated the 2011-19 underinvestment (Figure A9 in the Annex).

The European defence sector needs significant investment, merging and scaling up. The *Draghi Report* assesses the investment gap at EUR 50 bln, while other estimates point to smaller figures about EUR 20 bln (Bouabdallah et al., 2024). The EU thus lacks additional defence investment in the range between 30 to 70 per cent of the 2023 figure. One way to support investment is by letting firm size increase for instance through mergers. Cross-country take-overs may however be discouraged by EU competition policy and by national concerns to lose domestic capabilities.

Defence investment could also significantly benefit from access to funding from the EIB and NPBs. Indeed, defence projects are currently not eligible for EIB funding (although the range of eligible dual-use projects was only recently widened),[71] and NPBs – and often other financial institutions too – tend to apply the same criteria as the EIB. The EU is currently assessing several means of increasing financial resources available for defence expenditure (in ways possibly open to EEA countries and the UK).[72]

The risks of a greater US disengagement and rising geopolitical tensions, when not open wars at its borders, pushed the EU to introduce a framework to support its defence industrial base. The Commission's plan is based on two pillars, one concerning the supply and the other the demand.

The first pillar includes two key elements: Permanent Structured Cooperation (PESCO) and the role of the Commission's Directorate General for Defence Industry and Space (DG DEFIS).

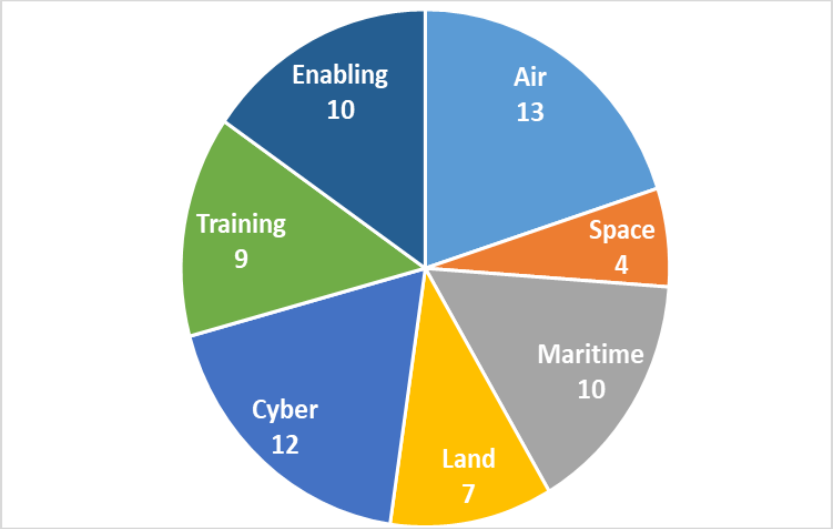
PESCO, established in 2017, is a Member States-led process, supervised by the Council, and relies on intergovernmental cooperation. It facilitates joint development of military capabilities and investment.[73] It is based on voluntary binding commitments and its projects belong to seven domains: Air and systems, Space, Maritime, Land, formations and systems, Cyber, Training and facilities, and Strategic enablers and force multipliers. There are currently active 65 projects (Figure 12).

France is the most involved country in PESCO: it participates in 52 (with the lead in 18) out of 65 projects and is an observer in other six. Italy participates in 35 projects and has the lead in 13; additionally, it plays the role of observer in other 15. This degree of participation is much higher than France's or Italy's shares in EU's GDP or population and may be connected with the fact that pooling resources in cooperative investment projects relaxes domestic fiscal capacity constraints, and consequently countries with less fiscal space have a stronger incentive to participate in PESCO.[74] Expenditure figures on PESCO projects are secret. It is, however, public information that the European Defence Agency (EDA) and the European Defence Fund (EFD) provide financial support.

[71] See EIB (2022), par. 2, e) and EIB Board of Directors steps up support for Europe's security and defence industry and approves €4.5 billion in other financing, press release, 8 May 2024.
[72] Special European Council, Conclusion, Brussels 6 March 2025, Part II European Defence, and Europe races to set up €500bln defence fund, Financial Times, 5 December 2024.
[73] Malta is the only EU Member State not participating in PESCO.
[74] For example, Germany participates in 27 PESCO projects (it is the lead in 11) and is an observer in other 18. The higher involvement of France and Italy may also reflect the relatively larger defence industrial sector.

Figure 12 - Distribution of PESCO projects per domain

(number of projects)



Source: European External Action Service, Annual Report on the Status of PESCO Implementation, 2023.

The second key element of the supply-side policy strategy belongs to the so-called Community method: it is DG DEFIS, created in 2019, responsible for the development and the implementation of EU policy on the defence industry and space activities, and, in particular, of the European Defence Industrial Strategy (EDIS).[75] It aims at strengthening the European defence technological and industrial base through increased and more collaborative investment from Member States. Furthermore, according to the EDIS the responsiveness of the European defence industry must be improved and a defence readiness culture must be integrated in all EU policies. Finally, in line with the general concept of open strategic autonomy it envisages cooperation with like-minded international partners such as the EEA countries, the UK, and possibly the US.

DG DEFIS and EDA co-manage the main financial instrument of EDIS, i.e. the EDF endowed for 2021-2027 with EUR 8 bln (one third of which earmarked to collaborative defence research projects and the rest for collaborative capability development projects). The EDF work programme for 2025 allocates EUR 1.1 bln for both research and development actions in the fields of ground combat, space, air and naval combat, energy resilience and environmental transition.

The second pillar of the EU defence industrial policy focuses on the demand side. To this aim, in 2023 the DG DEFIS launched an initiative on joint defence procurement (instrument for the reinforcement of the European defence industry through common procurement, EDIRPA), which allows Member States to coordinate and source the most urgent defence product needs.[76] The ultimate goal of EDIRPA is to generate a large and predictable demand to support defence industry's investment and to increase interoperability, a key element for effective joint defence. EDIRPA is endowed with EUR 310 mln from the EU budget. Although the possibility of direct funding from the EU budget is legally debatable, given the prohibition to finance military or defence expenditure (Article 41(2) TEU), the Commission claims that this prohibition does not apply to EDIRPA as it

[75] European Commission and High Representative of the Union for foreign affairs and security policy, Joint Communication JOIN(2024) 10 final, Brussels, 5 March 2024.

[76] Regulation (EU) 2023/2418. Note that EDIRPA is also open to EEA countries (Iceland, Liechtenstein and Norway).

only supports procurement by the armed forces of the EU Member States (and Norway) by covering 'cooperation costs', and it is not direct procurement by the EU. The funding is evenly distributed (EUR 60 mln each) among the five selected projects belonging to three fields identified in the EDIRPA Work Programme, i.e. Ammunition, Air and Missile Defence, and Legacy Systems and Platforms.[77]

In 2025 the European Defence Industry Programme (EDIP) will replace EDIRPA. In the Commission's view, EDIP is the regulation that implements the European Defence Industry Strategy.[78] It is endowed with EUR 1.5 bln from the EU budget for 2025-27 and aims at increasing defence industrial readiness in the EU, possibly including VAT exemptions and supporting PESCO projects. These initiatives are in line with the declared objective of stimulating an internal EU market for defence goods.

5 Concluding remarks and policy implications

Since 2020 the EU has been particularly affected by a sequence of unprecedented global shocks. The region is currently also facing the green and digital transition with its related ambitious goals. Industry remains key for EU competitiveness, yet several sectors (energy-intensive, automotive, electronics) have suffered in recent years. Although European firms are rethinking strategies to build up inventories and to diversify suppliers, in particular away from China, dependence from abroad of critical inputs for the twin transition is still very high. Furthermore, the EU is navigating the challenges posed by protectionist trade policies and by industrial policies adopted by several major economies, including the US and China.

Questions around EU industrial policy have thus turned from 'whether' (i.e. 'should the EU and its Member States carry out industrial policy?') to 'how should industrial policy be carried out'. EU industrial policy has also moved from the "horizontal" correction of market failures across sectors to "vertical" measures, explicitly intended to promote investment in strategic sectors, such as clean energy, advanced technologies, critical raw materials and defence.

Boosting productivity specifically of these sectors and addressing their digital and innovation gap relative to global competitors are essential to enhance Europe's economic resilience and security;[79] these objectives represent a more sustainable strategy to foster the region's competitiveness than outright wage compression. Furthermore, given the rapidly changing geopolitical environment, without denying its historic trade openness the EU needs to mitigate supply chain risks, reduce trade dependencies, and leverage more its internal market. On the one hand, policies aimed at strengthening global value chains, boosting domestic supply capabilities and promoting stable partnerships with like-minded countries that supply critical inputs (for example by further expanding the Global Gateway, the EU's strategy to cooperate with middle- and low-income

[77] Similar to EDIRPA is the Act in Support of Ammunition Production (Regulation (EU) 2023/1525), endowed with EUR 500 mln, which boosts the ammunition production capacity of the European defence industry.
[78] See Commission proposal COM(2024) 150 final, Brussels 5 March 2024.
[79] The establishment of an applied research EU agency could, for example, increase the innovation potential of the EU industry. Drawing on the experience of the US Defense Advanced Research Projects Agency, with the aim of fostering breakthrough innovation, the EU could strengthen the support to R&D projects in the early stages, departing from the model followed by the European Innovation Council which allocates 70 per cent of its budget to scale up SMEs, while only a small portion is devoted to start-ups (Fuest et al., 2024).

economies) are warranted.[80] On the other hand, the deepening of the Single Market also opens up the possibility of consolidation of European players in strategic sectors, such that these firms are able to compete on global markets, in accordance with European competition rules.[81]

EU industrial policy can accelerate the achievement of these goals. It currently relies on various instruments and sectoral initiatives, funded both by national and EU resources. State Aid is the largest source, while EU-level instruments, both within and outside the EU budget, play a much smaller role. Indeed, according to our estimates, the size of State Aid deployed for industrial policy objectives amounted to 0.44 per cent of EU GDP, well above the volume of corresponding resources for EU instruments (0.14 per cent). This resource imbalance reflects the fact that national policymakers are the main actors of industrial policy in the EU, while the tasks of the European Commission have been limited so far mainly to the definition of priorities and the implementation of strategic initiatives.

After the expiration of the Temporary Crisis and Transition Framework (June 2025), a systematization of State Aid rules is needed to ensure the consistency of EU regulation and to maintain the level playing field, which should not be disregarded while promoting industrial policy. The proposal of a new State Aid framework laid out in the *Competitiveness Compass* represents a step in this direction.

The reliance on national funds to finance industrial policies in the EU, however, raises two critical issues, i.e. EU-wide coordination of the specific measures and fiscal capacity heterogeneity across Member States. As regards the first, uncoordinated policy interventions amongst Member States may generate negative externalities on the other EU countries and broad-based welfare losses (Hodge et al., 2024; Altomonte and Presidente, 2024), and exacerbate the risks of fragmenting the Single Market. Wider cooperation at EU and national level is thus warranted to capture overall benefits from an EU-wide perspective (Dullien, 2024). The proposal of a coordination mechanism in the *Competitiveness Compass* would be key to align national industrial policies to EU priorities in strategic sectors. Another possibility is to enhance the EU dimension of industrial policy, for example by strengthening the Important Projects of Common European Interest (IPCEIs), both by increasing their size and by expanding their scope beyond the stage of basic research to cover also the actual industrialisation of innovation.[82] Since Member States' fiscal space is highly heterogeneous, it could be desirable to allow the EU to cover national contributions to IPCEI, as it has been already done in 2021 allowing Member States to use Next Generation EU funds. In general, the co-financing of common projects could be given a preferential treatment under the EU fiscal framework. This can also help to select vertical interventions in areas where they can be more effective and less distortive of competition.

As regards the second issue, in order to avert the risk of unleashing fiscal competition within the EU, it is key to strengthen the role of EU institutions and boost the resources available for EU

[80] On this, see the list in the *Competitiveness Compass* of the agreements the EU is currently negotiating with key trading partners.
[81] The proposals of better gearing EU competition policy to support competitiveness are amongst the most debated of the *Draghi Report*. The *Competitiveness Compass* acknowledges the need to review the EU's Horizontal Merger Control Guidelines, in particular to allow firms to close the innovation gap and to scale up in strategic sectors.
[82] For example, the *Draghi Report* suggests a reform of the current IPCEI framework that would extend its scope to cover 'first-of-its-kind' industrial infrastructure.

instruments and sectoral initiatives, also through the European Investment Bank. Securing adequate funding requires innovative financing mechanisms and stronger alignment and coordination of national and EU-level budgets. One possibility is to reallocate part of the existing EU budget to strategic, competitiveness-enhancing projects. Simply increasing the volume of aid is not, however, a panacea for the success of industrial policy. In order to internalize the externalities among the different stages of production (research, industrialization and actual production), vertical policy measures should promote the coordination among all stakeholders, taking into account supply chain implications. In the EU, Industrial Alliances play a role to this aim in some specific sectors. Moreover, the use of public resources should be monitored via a thorough conditionality framework: for instance only innovative firms that meet performance criteria and comply with conditionality requirements should be eligible for scaling-up support. While sectoral initiatives are key to reduce the technological gap relative to major global competitors and accelerate the twin transition, policy makers in the EU Member States should refrain from supporting national champions per se. The focus should be on boosting innovation and competition across firms by adopting a combination of horizontal policies and vertical initiatives.

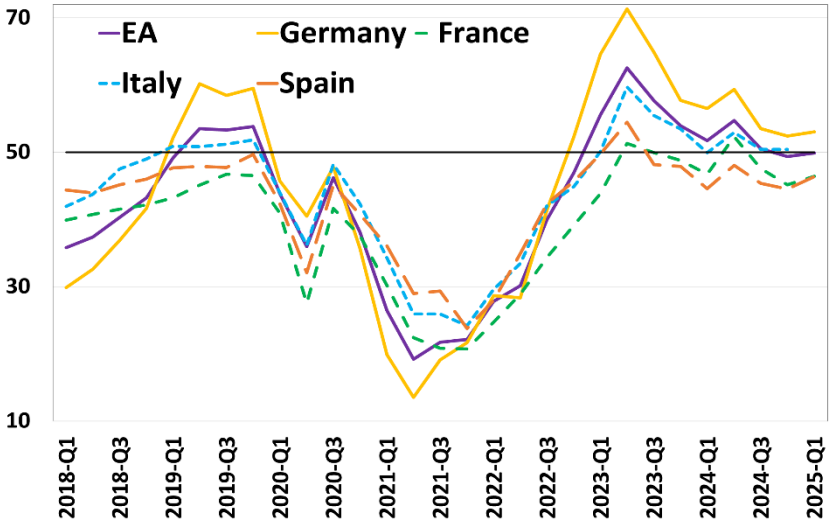
Since Russia's invasion of Ukraine, the EU has also given increasing attention to defence industry policy. As suggested by the *Competitiveness Compass*, to boost the competitiveness of the EU defence industry it would be necessary to overcome institutional fragmentation and to substantially raise the level of defence cooperation between Member States, by promoting interoperability, joint procurement and coordinated R&D activity concentrated on common European initiatives, pooling resources through Defence Projects of Common European Interest. It would also be useful to consolidate companies in this field, an option often opposed by national interests and restricted by current EU competition rules.

Overall, the path forward for EU industrial policy is fraught with significant challenges that demand a focused, reactive and empirically founded approach. Strengthened cooperation among EU Member States, possibly extended to like-minded partners, and effective reforms to boost competitiveness and economic growth are essential to reap the benefits of the twin transition and shield the region from future shocks. This would also allow the EU to better face the possible further reconfiguration of international relations following the manifold measures announced by the US at the time of writing of this paper.

Annex A - Additional information

Figure A1 – PMI delivery times in the euro area

(diffusion indices)



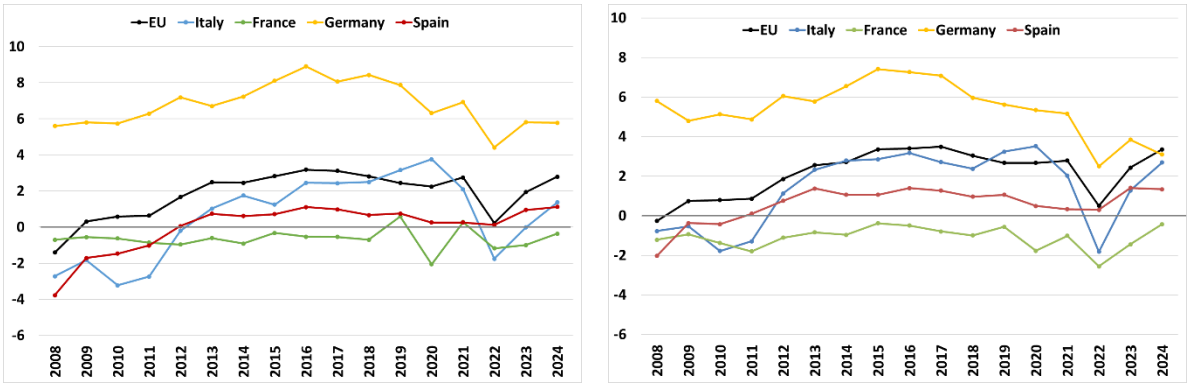
Source: Markit. The carry-over for 2025:Q1 is computed on monthly data up to February 2025.

Notes: The index is obtained by adding half the percentage of replies of 'stable' delivery times to the percentage of replies of 'improving' (i.e. shorter delivery times). The precise question wording is the following "Are your suppliers' delivery times slower, faster or unchanged on average than one month ago?". A reduction in the index points to longer delivery times.

Figure A2 – Current account and trade balances of the EU

(percentages of GDP)

a) Current account balance **b) Goods and services trade balance**

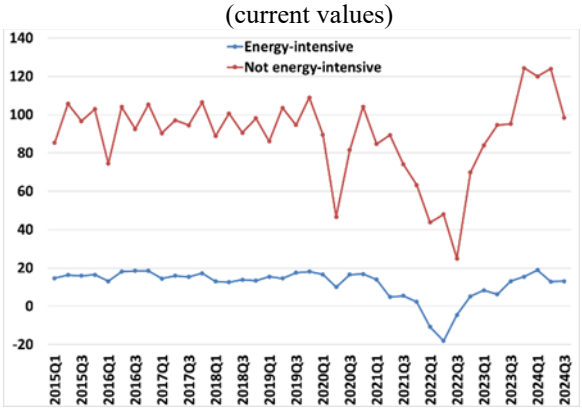


Source: ECB balance of payments and national accounts.

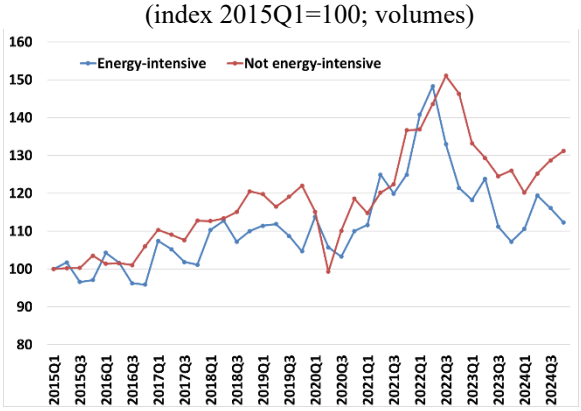
Notes: The EU balances are *vis-à-vis* non-EU economies and the other countries' balances are *vis-à-vis* the rest of the world.

Figure A3 – Trade balance and import product heterogeneity

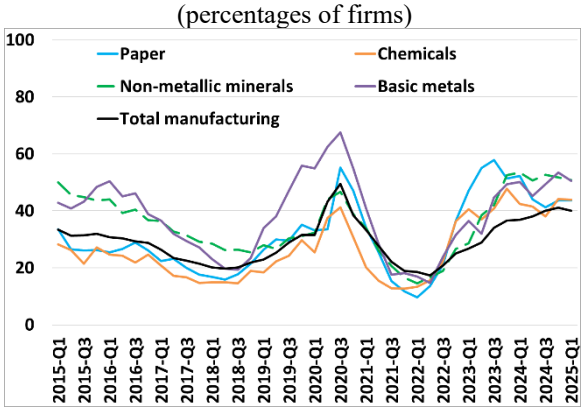
a) Trade balances
(current values)



b) Imports
(index 2015Q1=100; volumes)



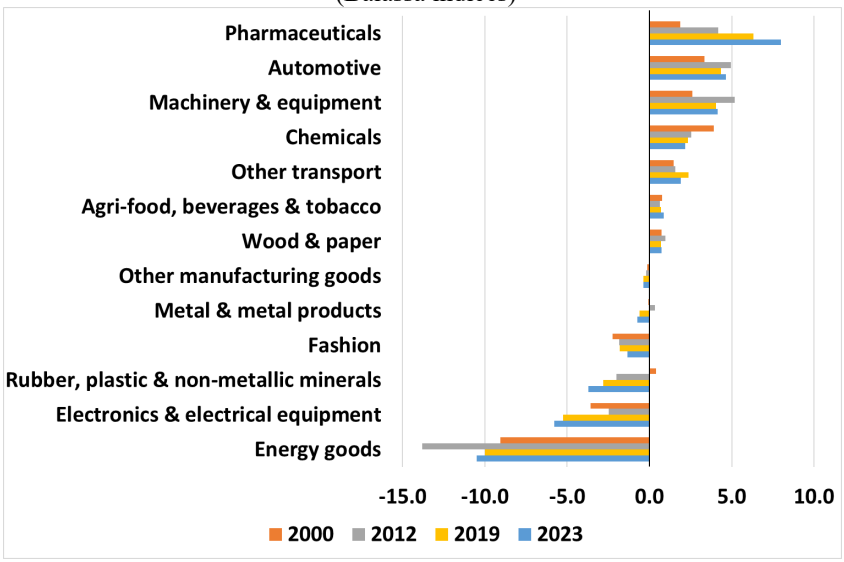
c) Demand as a factor limiting production
(percentages of firms)



Source: Authors' calculations on Eurostat trade data and producer price index data in charts a) and b); Eurostat, business survey in chart c).
Notes: In both panels a) and b) the energy intensity classification is based on Alpino et al. (2022), described in footnote 13. In panel b) imports are estimated in volume terms, based on NACE sectoral trade data, following the methodology in Giglioli and Giordano (2023). In chart c) we report the shares of firms that only answer "demand" to the quarterly question "What main factors are currently limiting your production?" (multiple choice).

Figure A4 – EU export comparative advantages by HS2 product codes

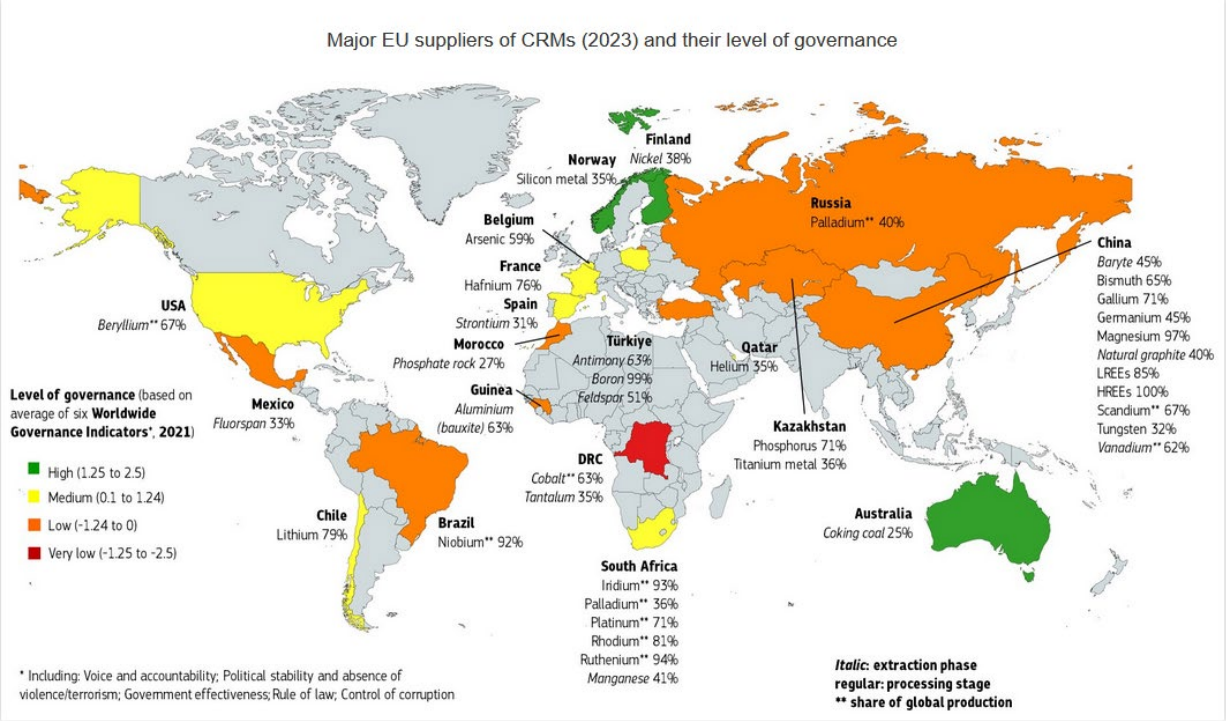
(Balassa indices)



Source: Authors'calculations on CEPII-BACI goods trade data.

Notes: The bars refer to the EU's Balassa index in each product grouping in the reference year, computed as $BI_{st} = x_{st}/x_t - x_{st}^{WORLD}/x_t^{WORLD}$, where x are goods exports (net of intra-EU trade) in euros, s refers to the reported product grouping, *WORLD* refers to all world exporting countries, and t is the reference year. If the Balassa index for a given product grouping is positive (negative), then the EU has (does not have) a comparative advantage in that product category.

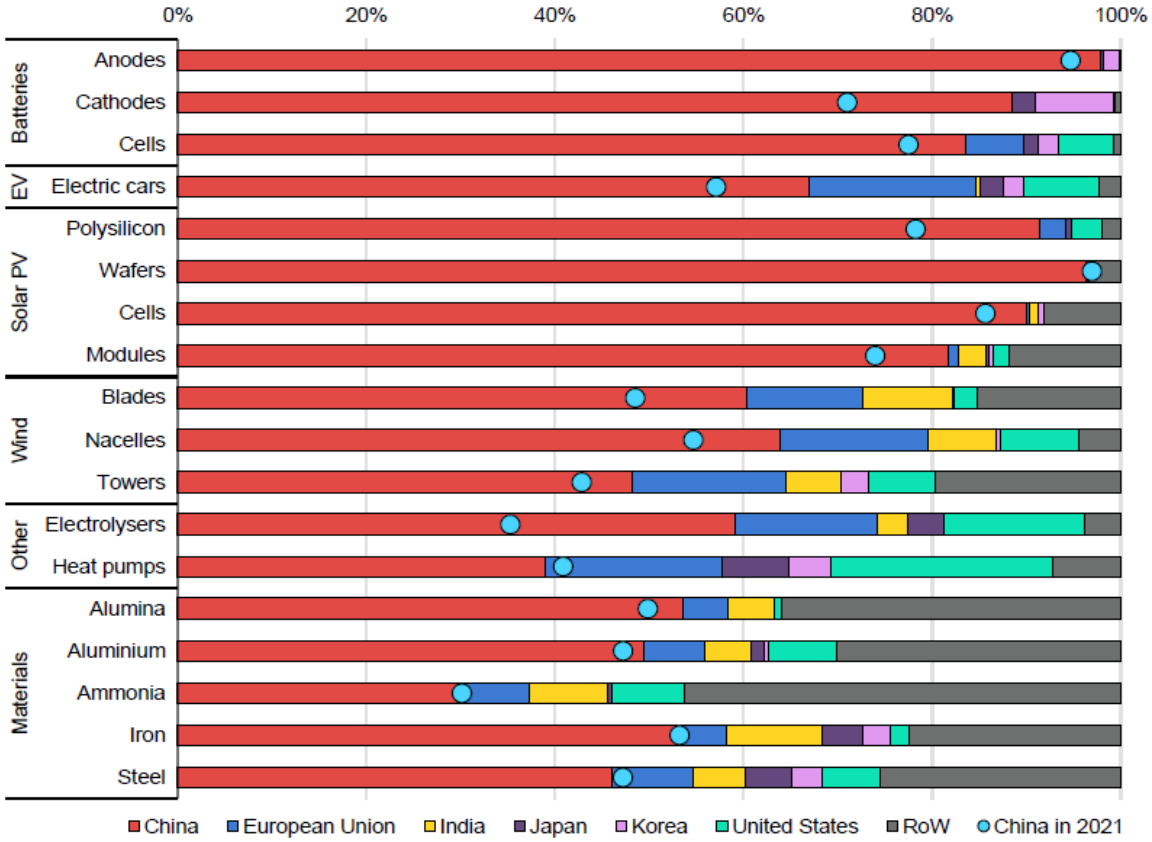
Figure A5 – Major suppliers of Critical Raw Materials in 2023 and their level of governance



Source: European Commission Raw Materials Information System (RMIS), available at https://rmis.jrc.ec.europa.eu/eu-critical-raw-materials.

Figure A6 – Installed manufacturing capacity of critical goods for the energy transition, by country/region

(2023)

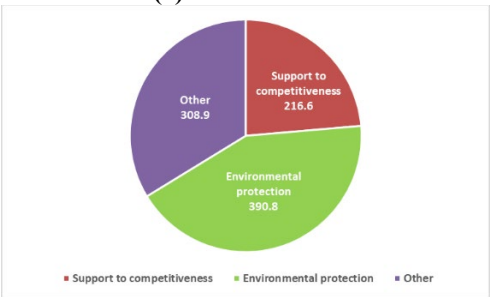


Source: International Energy Agency (2024).

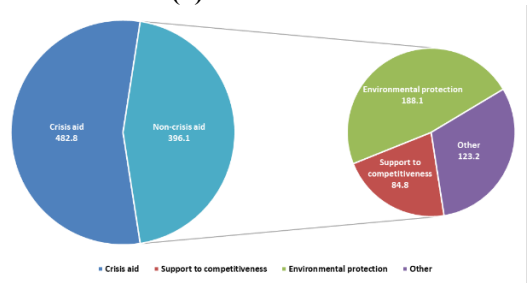
Figure A7 – State Aid in the main EU countries by objective

(EUR bln and percentage shares)

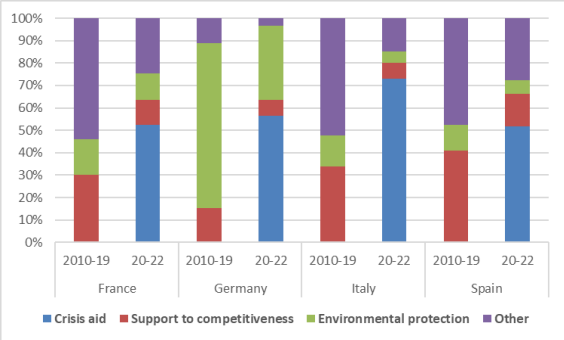
(a) 2010-19



(b) 2020-22



(c) main EU economies



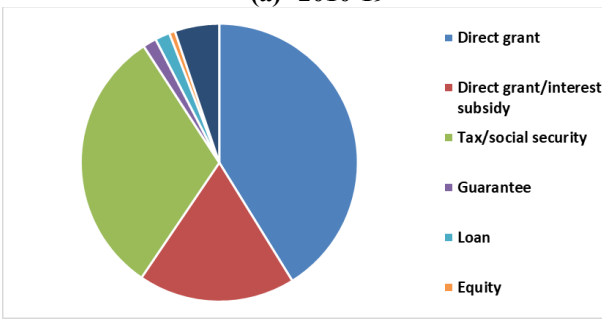
Source: Authors' calculations on European Commission data.

Notes: Total aid in current prices. 'Crisis aid' corresponds to the aid reported in the State Aid Scoreboard under the label 'serious disturbance of the economy'. 'Support to competitiveness' includes those labelled as 'closure aid', 'promotion of export and internationalisation', 'rescue and restructuring', 'research, development and innovation', 'structural development', 'SMEs including risk capital'; 'environmental protection' corresponds to aid labelled as 'environmental protection, including energy savings'; 'other' includes aid labelled as 'culture development and conservation', 'employment', 'social support to individual consumers', 'training', 'agriculture, forestry and rural areas', 'fisheries and aquaculture', 'compensation for damages caused by natural disaster', 'promotion of the execution of IPCEIs' and 'other'.

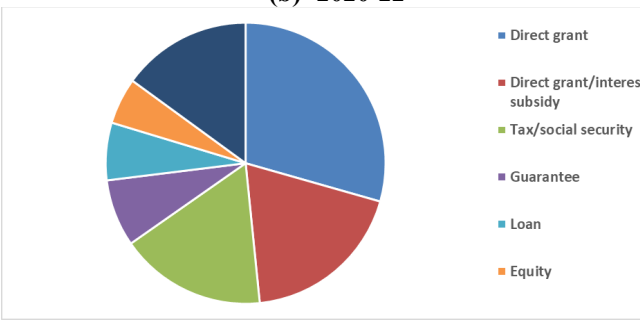
Figure A8 – State Aid in the main EU countries by instrument

(percentage shares)

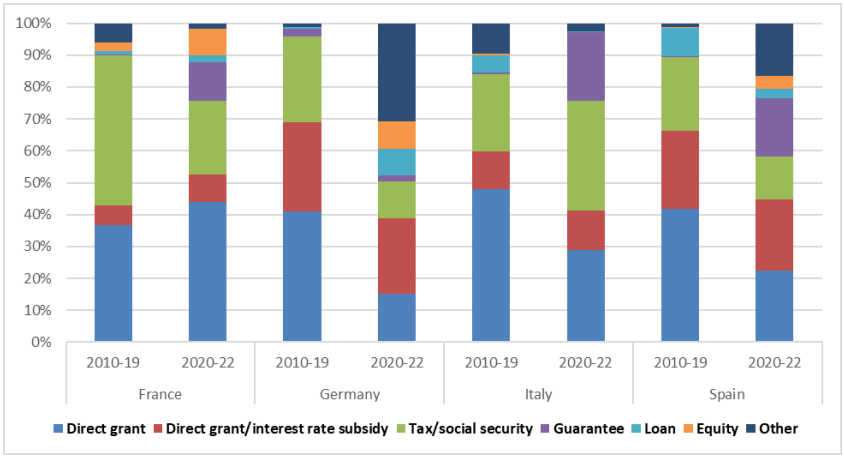
(a) 2010-19



(b) 2020-22

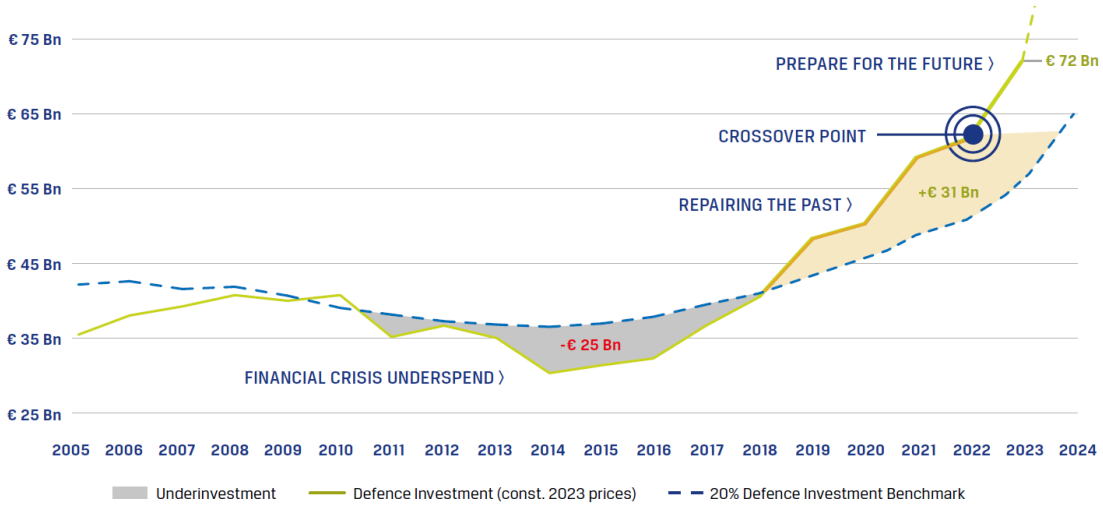


(c) main EU economies



Source: Authors' calculations on European Commission data.
Notes: Total aid in current prices. 'Direct grant', 'Direct grant/interest rate subsidy' and 'Guarantee' correspond to the same label in the State Aid Scoreboard; 'Tax/social security' includes 'Fiscal measures', 'Other forms of tax advantage', 'Reduction of social security contributions', 'Tax advantage or tax exemption', 'Tax allowance', 'Tax base reduction', 'Tax deferment', 'Tax rate reduction'; 'Loan' includes 'Loan/repayable advances', 'Repayable advances', 'Soft loan', 'Subordinated debt'; 'Other' includes 'Debt write-off', 'Interest subsidy', 'Provision of risk capital', 'Provision of risk finance', 'Reimbursable grant', 'Subsidised services' and 'Other'.

Figure A9 - Defence investment in the EU



Source: EDA (2024).

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