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European and Italian strategic dependencies for the twin transition: strengthening trade relationships with Africa

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Abstract

This policy brief shows Europe and Italy's position in the green and digital value chains and identifies in which areas strengthening trade relationships with Africa would help Europe to increase its open strategic autonomy. We also suggest that Italy and Europe should rely on a comprehensive strategy, concentrating resources to increase the manufacture of selected intermediate and final products and, at the same time, diversifying imports of raw materials and building stronger relationships with African countries. In so doing, Europe should implement inclusive policies that not only support its open strategic autonomy but also broadly facilitate technology transfer and favour the upgrading of economic activities in African countries.

The European concept of open strategic autonomy and the EU raw materials initiative

First the pandemic and then Russia's invasion of Ukraine have triggered a debate on the vulnerability of global value chains and the importance of ensuring European strategic autonomy. Indeed, the concept of strategic autonomy emerged in the context of common European foreign and security policies (European Council, 2013; European Union Global Strategy, 2016[1]) in a period of political tensions with Russia's annexation of Crimea in 2014 and the protectionist policies of the Trump Administration (European Central Bank, 2023).

The current debate on the vulnerability of global value chains fuelled by the bottlenecks emerging during the pandemic and Russia's invasion of Ukraine has its roots in the shifting of technological power towards Asia, resulting from China's (and a few other East Asian countries') catching up in the high value added stages of the (manufacturing) value chains. It can be argued that the China-US trade war is one of the main underlying causes of the deceleration in globalization that has taken place since the beginning of the 21st century.

The European, and particularly the German, market-based export-oriented model began to be questioned in a world where China and the United States are increasingly using trade and industrial policy measures to

[1] The Global strategy for the foreign and security policy of the European Union adopted on 28 June 2016.

ensure technological leadership in critical value chains. In this context, the European Commission revised its trade policy in 2021, including the concept of strategic autonomy within economic policies, but added the term "open" in order to imply its willingness to maintain a pro-trade approach. Referring to the new strategy, Executive Vice-President and Commissioner for Trade Valdis Dombrovskis said: *"The challenges we face require a new strategy for EU trade policy. We need open, rules-based trade to help restore growth and job creation post-COVID-19. Equally, trade policy must fully support the green and digital transformations of our economy and lead global efforts to reform the WTO. It should also give us the tools to defend ourselves when we face unfair trade practices. We are pursuing a course that is open, strategic and assertive, emphasising the EU's ability to make its own choices and shape the world around it through leadership and engagement, reflecting our strategic interests and values"* (European Commission Press Release, February 2021). The attempt to reconcile an open and multilateral approach with the priorities of reaching the goals of the green transition through stringent rules on European firms and at the same time defending them from unfair competition is the strategy's most ambitious and challenging goal. There are clear tensions between this model and the aggressive trade and industrial policies of the other two main economic areas, the US and China.

Besides trade policy, the EU is also rethinking its traditional approach to industrial policies, which for a long time were only based on market-oriented competition policies and the need to protect the single market by constraining state aid. The "new industrial strategy" for Europe explicitly refers to the need to ensure strategic autonomy in the context of the green and digital transitions, a strategy "that will support the twin transitions, make EU industry more competitive and enhance Europe's strategic autonomy" (Commission Communication, March 2020).[2]

But is this approach consistent with the challenges of the green and digital transition and Europe's position within these strategic value chains?

There is no doubt that the recent geopolitical developments, the pandemic and the war, have led to a more active role of the European Commission and the European Union in looking for new strategies and policies also as a response to those implemented by China and the US. The idea that some materials, products and technologies are more "strategic" than others means departing from a horizontal untargeted approach to more selective and mission-oriented industrial policies. The EU raw materials initiative (2008), which produces a periodic list of critical materials based on their economic importance and supply risks, goes in this direction by monitoring the possible European bottlenecks in the face of the double transition. In 2023, the European Raw Materials Act has identified European targets for strengthening Europe's position along the strategic raw materials value chain. In particular, these include: i) at least 10% of the EU's annual consumption for extraction; ii) at least 40% of the EU's annual consumption for processing; iii) at least 15% of the EU's annual consumption for recycling; iv) no more than 65% of the EU's annual consumption from a single third country. At the same time, the European Commission has published the fifth list of strategic materials following those of 2011, 2014, 2017 and 2020. Materials included in the list are selected on the basis of two criteria: economic importance and supply risk. The 2023 list includes 34 Critical Raw Materials (CRMs, hereinafter) compared to the list of 30 CRMs in 2020, with six new CRMs (Arsenic, Feldspar, Helium and Manganese) and two which have been excluded (Indium and Natural rubber). Moreover, Copper and Nickel, although not meeting the criteria to be

[2] Indeed the attention to critical raw materials dates back to 2008 with the purpose of identifying a list of critical materials every three years (the assessments of 2010, 2014, 2017, 2020 and 2023 have produced lists based on economic importance and supply risks).

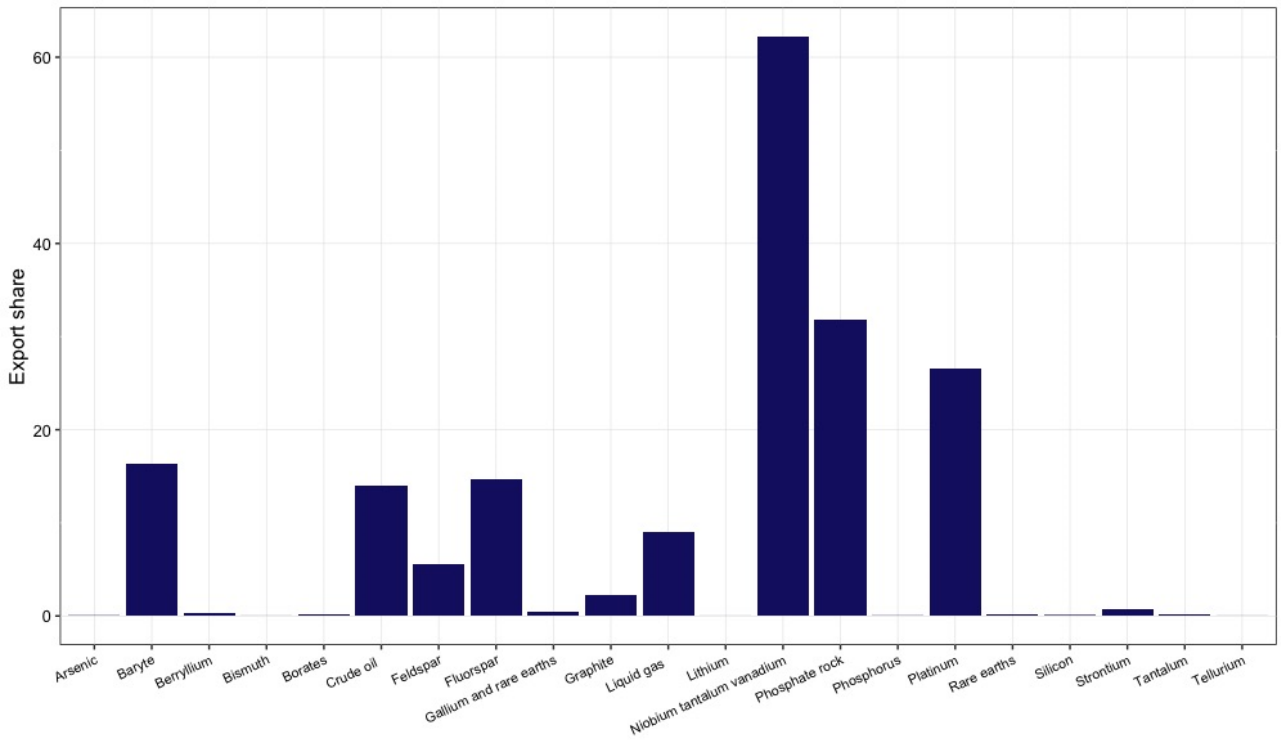
included among CRMs, have been identified as strategic materials with important applications respectively for electrification and for batteries.

A large number of these materials enter the strategic value chains of several green and digital products. In this policy brief, we first look at the position of African countries in the supply of CRMs and then focus on selected CRMs which enter the value chain of important products for the green transition (electric vehicles, photovoltaic cells and hydro-turbines) and for the digital transition (computers, communication equipment, microchips). We show the position of Africa, China, the US, Europe and Italy in the different stages of these value chains and identify in which areas strengthening trade relationships with African countries would help Europe to increase its open strategic autonomy. We also suggest that Italy and Europe should rely on a comprehensive strategy, concentrating resources to increase the manufacture of selected intermediate and final products and, at the same time, diversifying imports of raw materials and building stronger relationships with African countries. In so doing, Europe should implement inclusive policies favouring the upgrading of economic activities in African countries.

The European and Italian position in the digital and green value chains and the role of Africa

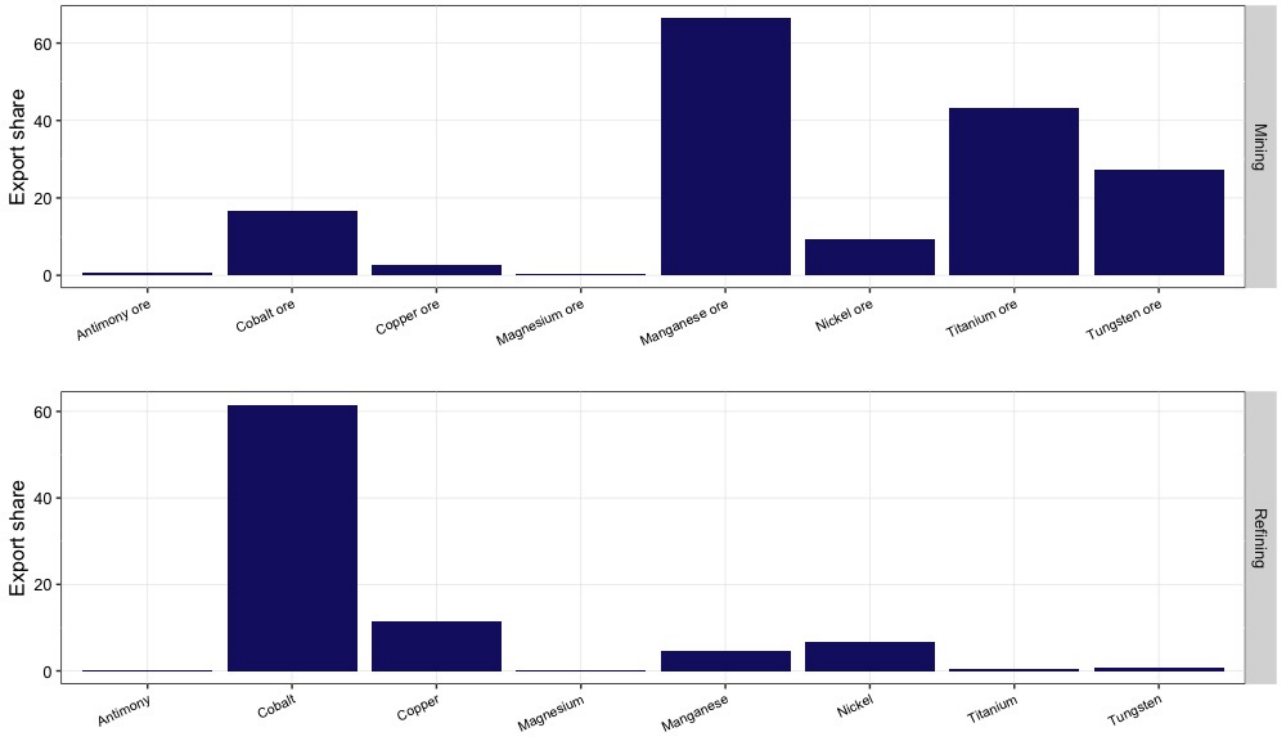
Figures 1 and 2 show the African share of exports of CRMs. For comparison we also include data for oil and liquid gas. In figure 2 we provide different figures for mining and refining for a subsample of CRMs for which data are available. The source of the data is the BACI-CEPII database, which uses trade data from UNCOMTRADE. Not all CRMs are reported.

Figure 1: Africa's export shares in CRMs in 2021



Source: own elaborations on BACI-CEPII database

Figure 2: Africa's export shares in CRMs in mining and refining in 2021



Source: own elaborations on BACI-CEPII database

The figures show the important role played by Africa in some materials such as Cobalt ore, Niobium, Tantalum and Vanadium, Manganese ore, Titanium. In particular, Cobalt, which is strategic for batteries, is concentrated in the Democratic Republic of Congo, a country that is also the main producer of Tantalum contained in capacitors for electronic devices. Also Rwanda and Nigeria have considerable export shares in this material. South Africa is the main producer of Manganese used in steel making and batteries and of the Platinum group of metals used in chemical and automotive catalysts, fuel cells and electronic applications.

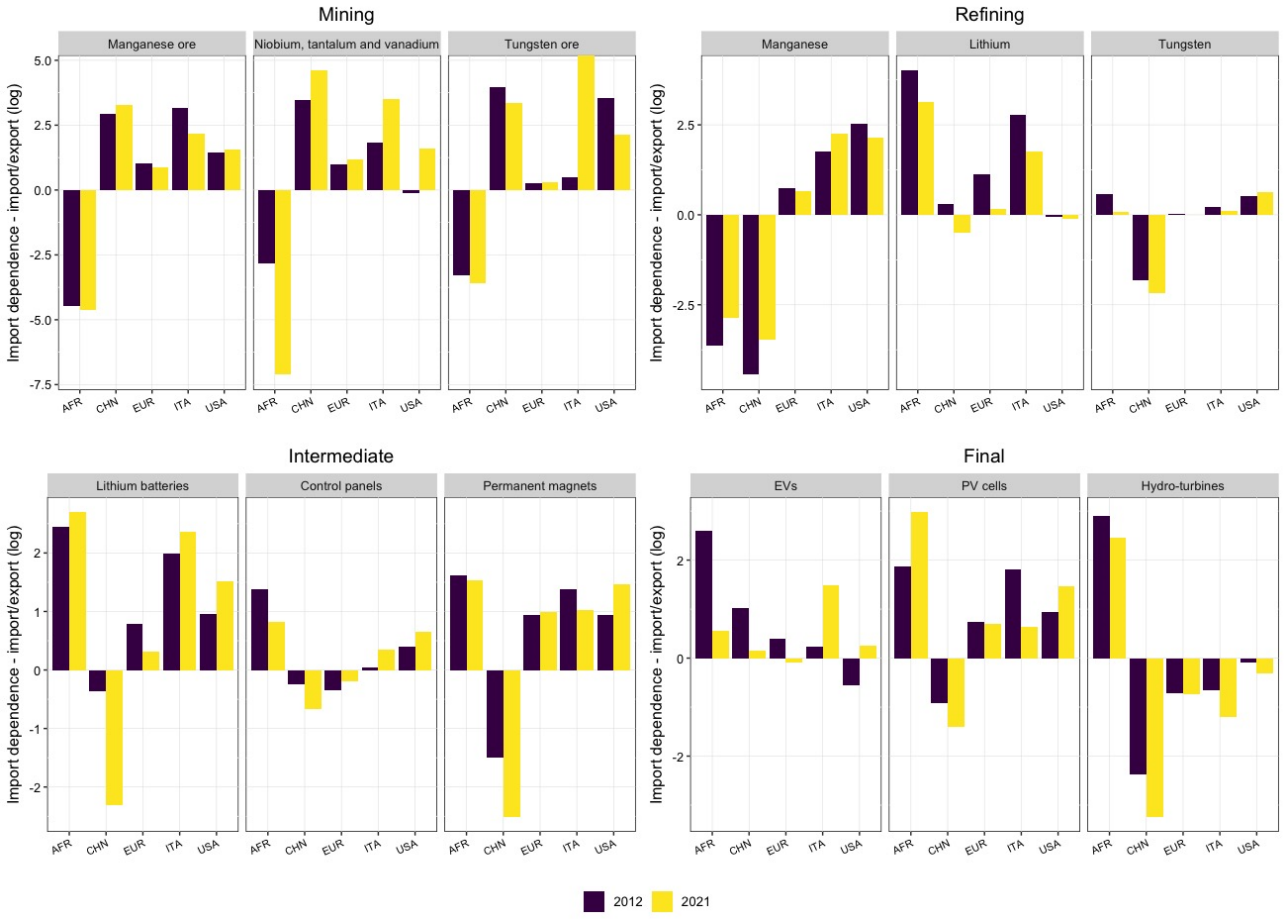
But what is the role of these CRMs in the value chain that leads to the production of green and digital goods?

In order to grasp the challenges that Europe and Italy face in managing the green and digital transition and the potential role of intensifying trade relationship with African countries, we look at the evolution of European and Italian import dependencies at the various stages of the value chain leading to selected green and digital products and the African strengths and weaknesses in the same value chains. The selected products are based on a recent study performed by the European Parliament's Committee on Industry, Research and Energy (ITRE, 2022).

The focus is on products of the green and digital transition, since these are the areas that will absorb a large amount of investments, given the necessity to move towards decarbonization.

Figure 3 shows the position of Europe, Italy, China, the US, and Africa in the supply chain of selected green products (electric vehicles, photovoltaic cells and hydro-turbines).

Figure 3: Import dependencies in the value chain for selected products of the green value chain in 2012 and 2021



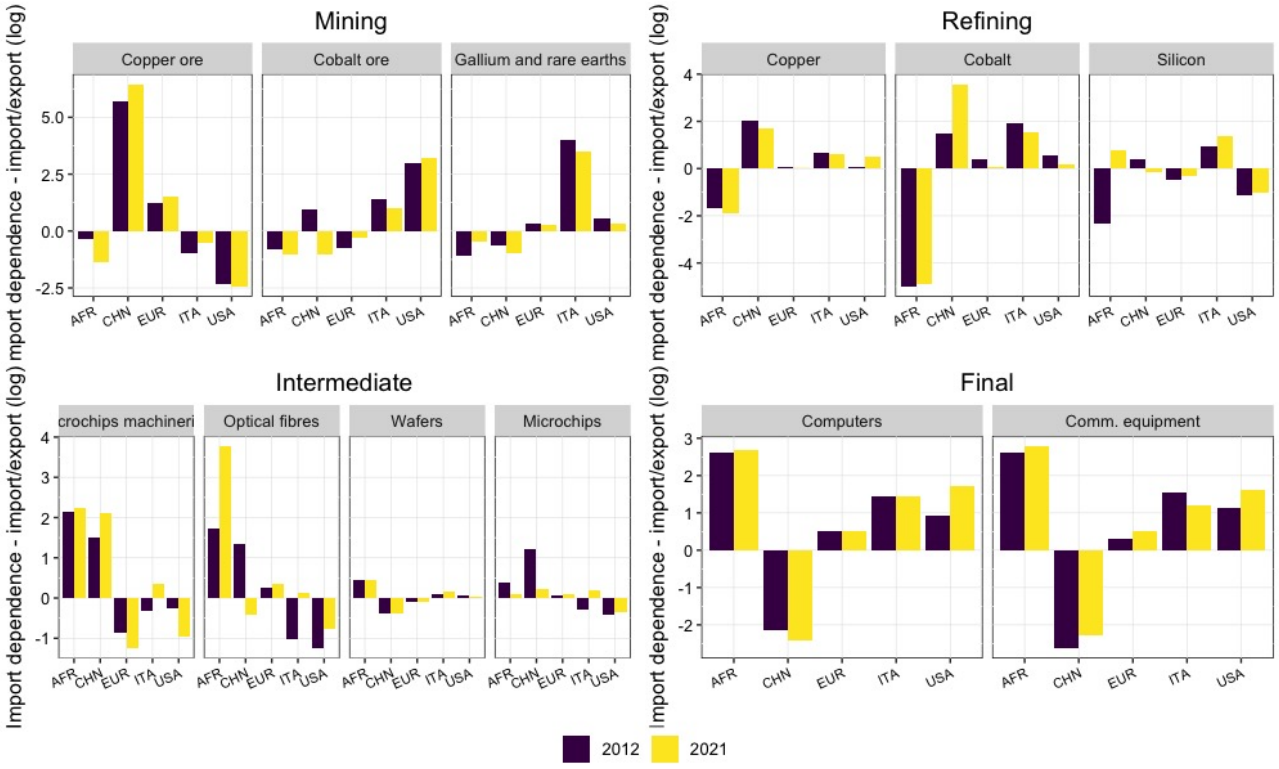
Source: own elaborations on BACI-CEPII database

At the final stage of the value chain, Europe is a net exporter (although marginally but improving its position since 2012) of electric vehicles (EVs) and hydro-turbines, but a net importer of photovoltaic cells, while Italy is a net exporter only of hydro-turbines. The dependencies are stronger at the intermediate stages of the value chains. Although Europe's dependence on lithium batteries decreased between 2012 and 2021, the area continues to have a trade deficit. In the case of Italy the deficit is larger and it has been increasing in the last ten years. Also for permanent magnets Europe and Italy strongly depend on imports. It is worth observing that China has an increasing trade surplus at all these intermediate stages, and also at the final stages with the exception of electric vehicles, an area in which it is decreasing its import dependency. Not surprisingly Africa as a continent has important import dependencies at all intermediate and final stages of the green value chain. At the same time, in terms of mining it is a net exporter of manganese, of niobium, tantalum and vanadium (with increasing surpluses over time) and of tungsten. China, Europe and the US are net importers of all these materials in 2021. In terms of refined materials, Africa has a trade advantage only in manganese, an area in which also China has a trade surplus, in addition to other refined materials such as lithium and tungsten in

2021 (with all other areas being net importers). Overall, China undoubtedly shows the strongest position in the green value chain and the more pronounced positive dynamics.

Figure 4 focuses on the value chain for digital products (computers and communication equipment).[3]

Figure 4: Import dependencies in the value chain for selected products of the digital value chain in 2012 and 2021



Source: own elaborations on BACI-CEPII database

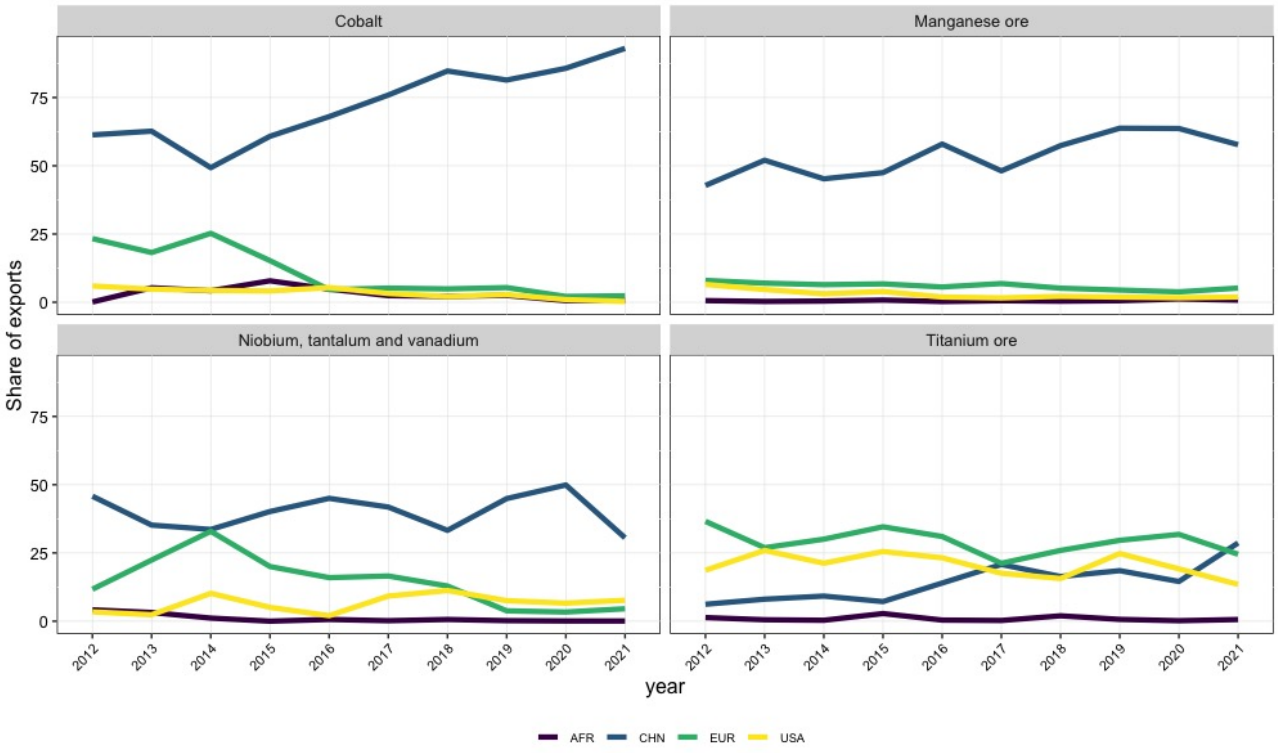
Europe, and Italy even more so, has a trade deficit in both communication equipment and computers. Europe as a whole is also a net importer of some key components entering the production of these goods, namely microchips and optical fibres, while it is a net exporter of machinery for microchips. Between 2012 and 2021, Europe increased both its disadvantages in microchips and optical fibres and its advantages in machinery for microchips. Italy has similar dependencies but has lost its trade surplus in the machineries for microchips and in optical fibres between 2012 and 2021. China has a trade advantage in the final stages of the chain (computers and communication equipment) but a trade disadvantage in microchips and microchip machineries. The US has a trade disadvantage in computers and communication equipment but is a net exporter of microchips, microchips machineries and optical fibres. Finally, as expected, Africa is import dependent in all final and intermediate stages of the digital value chain. However, it has a trade advantage in exporting copper, cobalt and gallium (ores) and refined copper, cobalt and silicon (this last material only in 2021). Among the other areas, China is strongly dependent on copper, the US on cobalt, Europe on copper and Italy on gallium and rare earths.

[3] Machineries for microchips are represented at the intermediate stage of the chain since they are used to produce microchips. However, in an input output perspective they are a final capital good.

Overall, the data show strong interdependencies between Europe, China and the US in the digital value chain, with the three economic areas specialising in different stages and products and the role played by Africa mainly at the stage of mining and in some cases at the stage of the refining of the CRMs.[4]

But what are the trade relationships between Africa and the other areas (Europe, China and the US) in CRMs? Figure 5 focuses on four CRMs that are strategic for either the green or the digital value chain and for which Africa has a trade advantage. It also shows the dynamics of exports to the different geographic areas.

Figure 5: African exports of CRMs by destination (2012-2021)



Source: own elaborations on BACI-CEPII database

The predominant role of China in the trade relationship with Africa is apparent. In the case of cobalt, the share of African exports going to China has been constantly increasing and has reached 93% in 2021. Europe, which had a share of about 25% in 2014, sees a sharp decrease in the following years, approaching zero at the end of the period. In the case of manganese, the dynamic is less pronounced but the dominance of China is clear with a share of 80% in 2021. When looking at niobium, tantalum and vanadium, we also observe the dominant position of China and the decreasing importance of Europe. Titanium is the only material for which the market is more spread across the different areas (in 2021, China has a share of 29%, followed by Europe with a share of 24% and by the US with a share of 13%). But also in this case, while China shows an increasing trend, Europe and the US decrease their imports from Africa. These data reflect China's growing interest in Africa, which has become China's largest trading partner since 2009. At the same time, concern has been expressed by unions

[4] These data do not take into account the advantages and disadvantages at the level of the technologies (for some evidence on this point, see Guarascio et al. 2023). Yunxiong Li et al. (2022) show that African countries do not have technological capabilities in these areas as proxied by patent data.

and civil society about the poor working conditions in Africa and the lack of willingness on the part of the Chinese enterprises investing in the continent to preserve the environment.

The position of the various areas in trading CRMs can be better assessed with the use of Social Network Analysis (SNA). By harnessing the power of SNA, we can uncover the intricate dynamics of CRM trade networks, shedding light on the global implications of these strategies for different regions and economies.

In the network, a node's centrality signifies its level of involvement in trade with other nations, identifying significant players in the trade network. The nodes in the network represent countries, and the links denote trade flows between them. Node size corresponds to the number of connections, while link size reflects the exported goods' value.

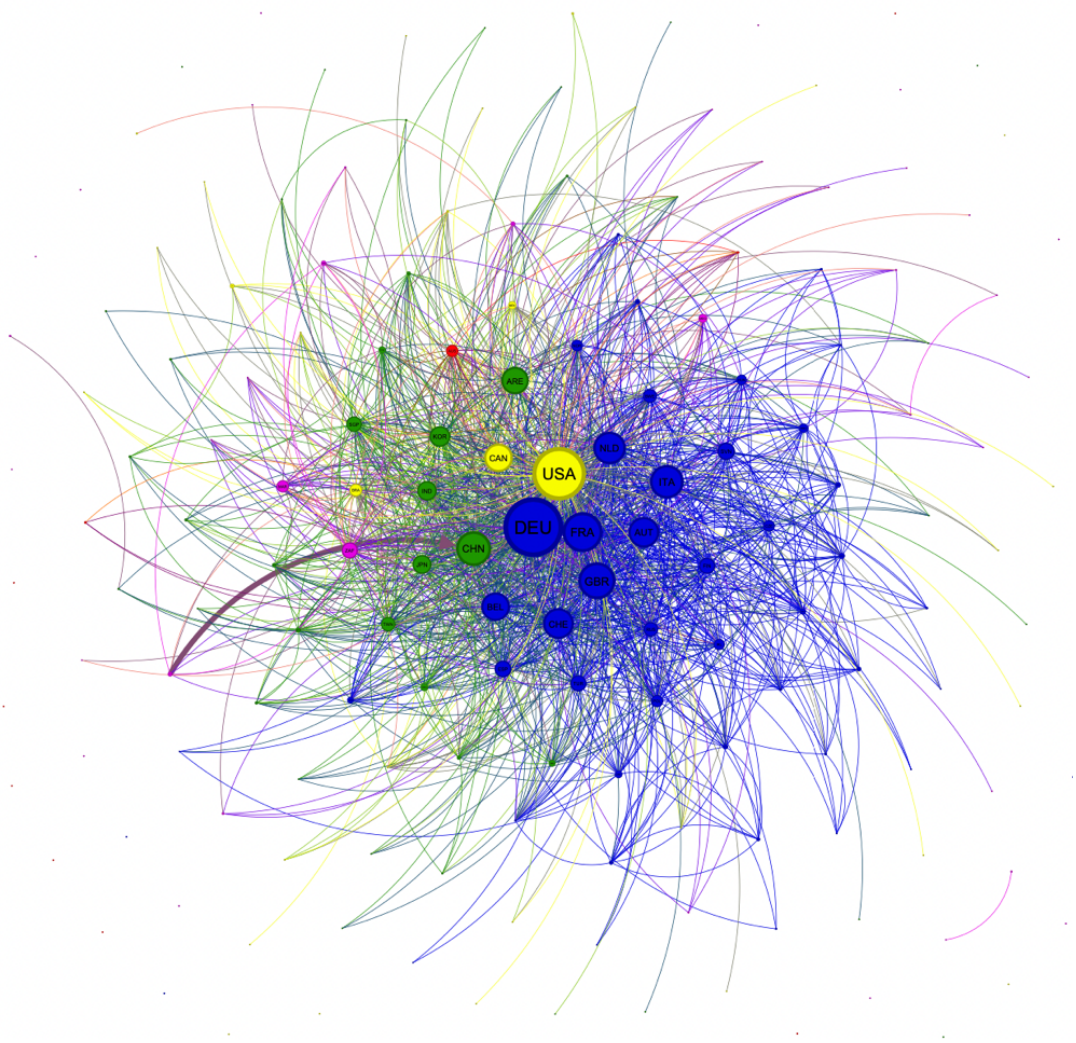
Figures 6 and 7, depicting world trade exports of CRMs like Cobalt and Niobium, highlight the substantial role played by African countries, particularly in these materials.

Notably, in the Cobalt network (figure 6) there is a pronounced flow of CRMs from semi-peripheral nations like the Democratic Republic of Congo to China, which acts as a core player in the network. European countries, in particular Germany, and the US are central in the network since they trade with a large number of countries but are peripheral to African countries.

For Niobium (figure 7), the US's dominance arises from its role as a bridge between all nations in trade. However, China's position as the world leader in Niobium trade is evident through its extensive trade relationships with African exporting countries in terms of quantity and trade value.

This SNA-based analysis underscores China's pivotal role in controlling the flow of CRMs from Africa and its broader influence on global trade. This central role can have significant economic and geopolitical implications. Europe's relative disadvantage in this context becomes evident, particularly concerning its direct access to resources that are critical to the green and digital transition.

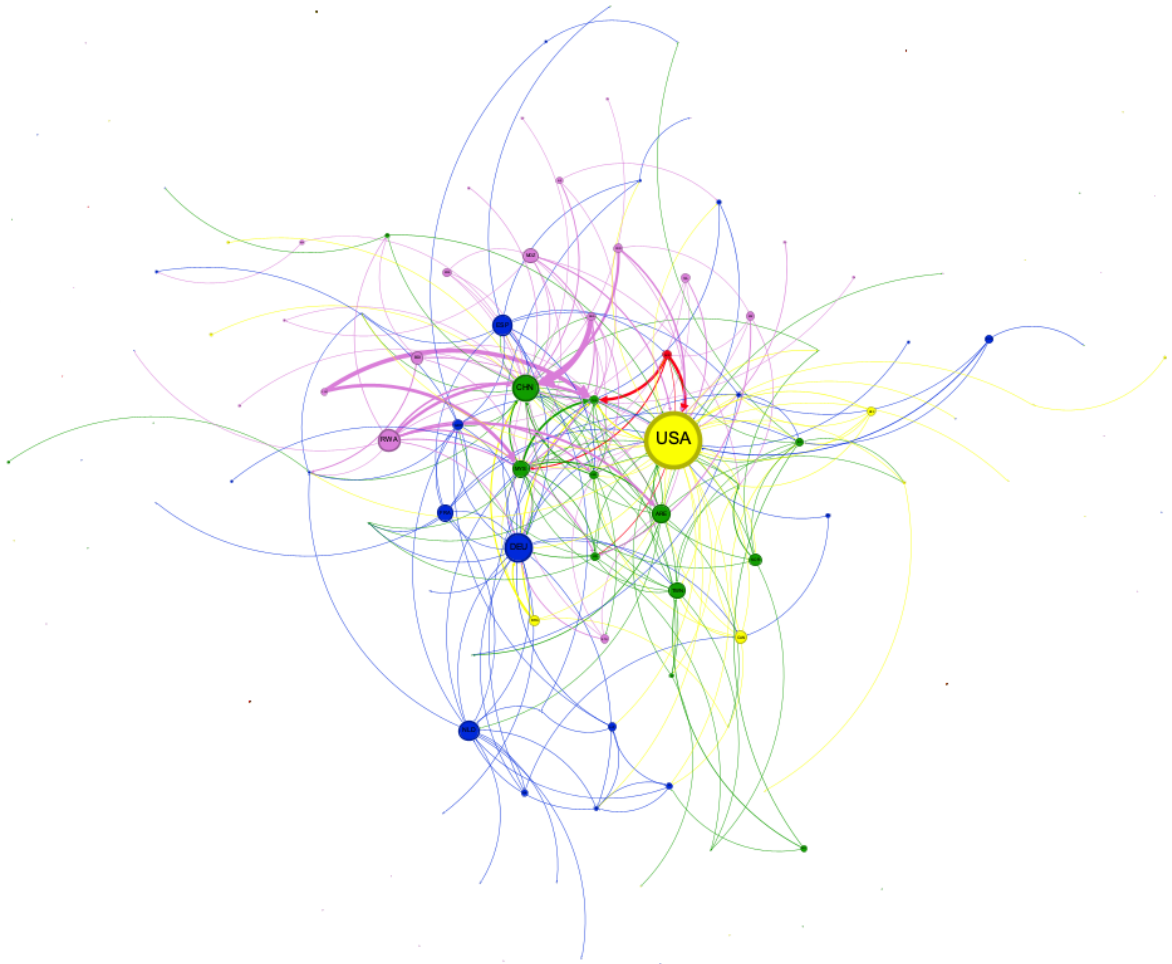
Figure 6: Cobalt network created with outdegree centrality measure.[5]



Source: own elaborations on BACI-CEPII database and Gephi network visualization software

[5] Colours of the continents: a) Africa purple; b) Europe blue; c) Asia green; d) America yellow; e) Oceania red.

Figure 7: Niobium network created with outdegree centrality measure



Source: own elaborations on BACI-CEPII database and Gephi network visualization software

Conclusions

In recent years, the EU has increased its attention to industrial policy as a strategy to cope with the green and digital transition. New tools have been conceived and new terms such as strategic autonomy have become popular and have been borrowed from the language of common foreign and security policies to be included within the EU industrial strategy. In her recent State of the European Union Address (September 2023), Ursula von der Leyen emphasized the role of Europe in the green transition but also recognised Europe's weaknesses: "*We have seen real bottlenecks along global supply chains, including because of the deliberate policies of other countries. Just think about China's export restrictions on gallium and germanium– which are essential for goods*

like semiconductors and solar panels. This shows why it is so important for Europe to step up on economic security. By de-risking and not decoupling".

The data analysed in this policy brief show that much still has to be done for Europe to be competitive in the green and digital value chains, also considering the aggressive policies undertaken by China and US. The geopolitical tensions between the US and China and the discriminatory trade policies implemented by these countries require a centralized European response also in order to defend a rules-based international trade system and make it more inclusive.

As Soete and Van Kerckhoven argue, the "new" purposes of strategic autonomy in the European Industrial Strategy imply a focus on "de-risking" rather than increasing technological and industrial capabilities in digital and green value chains. This emphasis on reducing dependency might not only represent a trade-off in terms of public investment choices, but also have backlash effects on EU internal competition and, arguably, in terms of geopolitical tensions and inclusion. First, national policies and national funds risk being ineffective and putting countries with different fiscal capacities in an asymmetric position, as well as counteracting the effects of the EU Cohesion Policy. Second, missing the opportunity to strengthen trade relationships with Africa means not being able to contribute to raising environmental and work standards in crucial value chains in African countries (which China clearly shows less interest in) and to provide the opportunity of technology transfer that might support industrial upgrading in Africa.

Europe therefore requires bold political will to design an effective multi-fold strategy. On the one hand, it is essential to identify areas of potential advantage where European resources can be concentrated. These should involve mostly the final and intermediate stages of the value chains (such as electric vehicles, batteries, machineries for chips). Several instruments such as the Strategic Technologies for Europe Platform (STEP) or the Important Projects of Common European Interest (IPCEI) can be used to target technologies and manufacturing activities provided that they are funded and coordinated at the European level. At the same time, the reduction of risks associated with the concentration of certain materials, not only at the extraction level but also at the refining level, can be achieved by facilitating investments along commodity value chains in those emerging countries that can benefit from transfers of technological know-how to reduce the environmental impact of existing extractive activities, diversify production, and create local added value. In this policy brief we have shown the opportunities for increasing trade partnerships with African countries. While Europe has adopted an Africa-Europe investment package within the Global Gateway (the EU's investment strategy targeting partner countries), the increasingly dominant position of China in Africa requires a step forward in identifying effective strategies, also involving local actors, to invert this trend.

References

European Central Bank (2023), The EU open strategic autonomy from a central bank perspective, n. 311, March 2023

European Council (2013), Conclusions, EUCO 217/13, Brussels 20 December 2013.

Guarascio, D., J. Reljic, G. Cucignatto, G. Celi and A. Simonazzi (2023), Between a rock and a hard place. Long-term drivers of EU structural vulnerability, Working Papers in Public Economics 237, University of Rome La Sapienza, Department of Economics and Law.

Le Mouel, M. and Poitiers, N. (2023), Why Europe's critical raw materials strategy has to be international, Bruegel Analysis, April 2023.

Soete, L. and Van Kerckhoven (2023), Deglobalisation and competition policy: the challenge to European economic integration, Network Law Review

Yunxiong Li, G., A. Ascani and S. Iammarino (2022), The Material Basis of Modern Technologies. A Case Study on Rare Metals, Working Papers 59, Birkbeck Centre for Innovation Management Research.