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Towards a European Infrastructure Union

Prioritizing Connectivity in Times of Institutional Crisis

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Due to external pressure and internal disagreement, the EU is currently exposed to centrifugal forces. In such a situation, the EU must avoid drowning in ideological debates and focus on projects of undisputed common interest. A key project is the strengthening of joint infrastructure, which remains vital for further economic and social integration. Despite the extensive EU funding policies of the last decades, bottlenecks still exist in many areas of cross-border infrastructure. Added to this are the new modernization requirements resulting from the green and digital transformations. With new policy goals on the horizon, the importance of basic infrastructure is at risk of being downplayed during the upcoming EU budget negotiations. This cepInput analyses the economic role of cross-border infrastructure investments and current incentive barriers, pleading for a new multi-level support strategy.

- An analysis of the evolution of EU-internal cross-border trade costs over the past twenty years indicates very limited improvement in economic connectivity. On average, estimated cost savings due to improved connectivity amount to just 0.2% of trade costs per year across the EU. Cumulative cost savings over the twenty-year period are estimated to total 148 billion EUR. In country comparison, Germany and the Netherlands benefited most from these savings.
- The economic nature of cross-border infrastructure and the highly complex regulatory environment require intensive cooperation between public and private stakeholders, causing incentive problems and high coordination costs. Support policies should focus on providing tailor-made instruments for risk sharing, while minimizing regulatory risk by harmonizing market regulation and overcoming administrative bottlenecks.
- The EU should align its infrastructure support more strongly with strategic, cross-sectoral economic objectives. A clear prioritization of infrastructure projects that are essential for the EU's economic modernization should be coupled with maximum flexibility in the choice of funding instruments.
- In the upcoming EU budget negotiations, the Commission should stress the relevance of infrastructure support in response to any Member State claims to shift resources to the protection of individual industries.

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1 Background

To remain competitive in a fragmented and fragile global economy, the EU must exploit its key asset: its internal market. Removing the remaining barriers to internal trade and competition can stimulate economic growth in multiple ways. It increases the size of markets, improves the efficiency of internal resource allocation and reduces costs for new technologies through economies of scale. In this way, it supports growth both in the short term and, by fostering the green and digital transformation, in the long term. In addition to regulatory convergence among Member States, market integration also has an indispensable physical dimension. Infrastructure capacities are important for cross-border exchange within the EU and cover a wide range of asset classes, such as railway connections, electricity lines, gas pipelines and jointly used research infrastructure.

The economic nature of these infrastructure goods presents specific challenges for investment. In many cases, they cannot be clearly classified as either strictly private or public goods, but instead fall somewhere in between. Consequently, neither unsupported private activity nor purely public engagement can be expected to yield socially optimal investment levels. Instead, cooperation between the public and private sectors is required. This can take various forms like publicly regulated revenue flows or direct cooperation in investment financing. Furthermore, the green transformation requires not only the strengthening of existing cross-border connections (e.g. electricity interconnectors), but also the creation of entirely new transport infrastructures for renewable gases and CO_2. Addressing these multiple challenges requires targeted, risk-balanced policy solutions.

For these reasons, the EU has signaled its intention to boost investment in cross-border infrastructure. Through the Connecting Europe Facility alone, it allocates 25.8 billion EUR to transport infrastructure projects, 5.84 billion EUR to energy projects, and 1.5 billion EUR to digital projects during the current financial period (2021–2027).[1] In its proposal for the next Multiannual Financial Framework 2028-2034, the Commission foresees a strategic role for the Connecting Europe Facility in strengthening European competitiveness.[2] Although public financial support can effectively boost private infrastructure investment, it does not eliminate all barriers. In particular, uncertainty surrounding permit procedures and the long-term regulatory environment of markets increases financing costs and encourages a wait-and-see approach in the private sector. Furthermore, in a shifting global market environment, the extent and limitations of public-private cooperation must be continuously renegotiated to avoid disincentives and excessive public risk-taking.

Against this background, this cepInput argues for a dedicated strategy to strengthen cross-border connectivity within the EU, based on the long-term vision of a European Infrastructure Union. It emphasizes the importance of cross-border connectivity for the long-term EU goals and highlights existing investment barriers. It documents the status quo of infrastructure cooperation in the EU and the existing set of EU support instruments. It estimates the contribution of cross-border connectivity to reducing trade costs. Finally, it provides a set of policy recommendations to strengthen cross-border connectivity.

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1 European Commission (2025a). Connecting Europe Facility.

2 European Commission (2025b). A dynamic EU Budget for the priorities of the future - The Multiannual Financial Framework 2028-2034. Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. COM/2025/570 final.

2 The value of EU cross-border connectivity

2.1 Classification

The term "connectivity" is used in many scientific disciplines and different contexts. In the most general sense, it signifies the "the quality, state, or capability of being connective or connected".[3] In an economic context, connections between firms, regions or whole countries are primarily established through the exchange of products, skills, information or ideas. Here, the concept of connectivity can be used to describe the extent of economic exchange (state), its characteristics (quality) or the availability of means to establish such exchange (capability).

For the purpose of our analysis, we adhere to the latter definition of connectivity. Accordingly, the level of cross-border connectivity in the EU is understood as the endowment with means necessary for cross-border exchange between Member States. In principle, this includes both tangible assets like cross-border transport infrastructure and intangible assets (e.g. cultural and institutional proximity of Member States). A main discrepancy between these two classes of assets is that intangible assets are typically the outcome of long-term social processes and are hence less influenceable by short-term political intervention. At the same time, tangible and intangible assets are interrelated: Improved cross-border infrastructure can foster long-term institutional convergence by stimulating cross-border mobility.[4]

In policy perspective, investments in physical infrastructure thus promise benefits from increased cross-border connectivity. These benefits can have multiple dimensions. **A direct economic benefit lies in the reduction of the costs of cross-border exchange itself**. Improved roads, new railway connections or enhanced ICT networks in border regions can lower the cost of logistics services across borders, resulting in lower prices for consumers and/or higher margins for producers. At the same time, by improving the competitiveness of products traded across borders, the economic impact goes beyond direct cost savings. It contributes to the integration of national markets on both sides of the borders. In this way, by stimulating a more effective division of labor, medium-term productivity gains can be realized by the trading countries. Through the EU-wide internal market, these benefits can spill over to the remaining Member States as well.

Further long-term benefits result from the impact of connectivity on technology development. Integrating markets across borders creates a larger sales potential for the scaling of new technologies, leading to steeper cost reductions and faster technology diffusion improving the competitive edge of the EU economy as a whole.[5] As highlighted by new trade theory, a larger sales market also contributes to increased product differentiation, thus creating additional benefits from product variety for consumers.[6] Additional positive effects for the economy of border regions relate to factor supply. By stimulating cross-border mobility of workers, connectivity enlarges the pool of skills available to local firms,

[3] Merriam- Webster (2025). Dictionary.
[4] Medeiros, E. (2019). Cross-border transports and cross-border mobility in EU border regions. Case studies on transport policy, 7(1), 1-12.
[5] Ferrier, G. D., Reyes, J., & Zhu, Z. (2016). Technology diffusion on the international trade network. Journal of Public Economic Theory, 18(2), 291-312.
[6] Krugman, P. (1980). Scale economies, product differentiation, and the pattern of trade. American economic review, 70(5), 950-959.

which lowers matching costs on local labor markets.[7] A similar logic can apply to the availability of other production inputs like specialized intermediate products.

All of the aforementioned benefits have in common that they translate into measurable effects on income and other economic indicators. In addition, there can be indirect effects of increased cross-border connectivity that are less easy to pin down in economic terms. **One is the benefit of increased supply security of scarce, hard-to-replace goods**. Well-established cross-border trade networks reduce the risks of disruptions in the supply of such goods to single countries. A special significance does this effect have in energy supply. Enhanced capacity for the cross-border transport of electricity acts as an additional buffer for national electricity markets, helping to balance out supply fluctuations from volatile renewables sources. This, in turn, reduces management costs of energy systems.[8] **Another potential indirect effect of cross-border connectivity relates to local institutions**. There is evidence that trade integration can enhance the quality of basic local institutions in the trading countries like property rights and contract enforcement, by initiating a "race to the top" in institutional quality to lower transaction costs.[9]

2.2 Empirical approach

2.2.1 Setup

Practically measuring the value of cross-border connectivity for the EU is a challenge, mainly due to the prevalent data limitations. Assessing the value of the different dimensions of connectivity and its relevance for different economic sectors requires detailed case studies with limited significance for a macroeconomic evaluation. However, information from trade data does allow to investigate a potential direct effect, the reduction of costs in EU-internal merchandise trade. For this, we follow a recent approach by the OECD.[10] They analyze the costs of cross-border trade by comparing trade values reported in the cif (cost, insurance, freight) format with values reported in the fob (free on board) format. In international trade statistics, merchandise imports are reported by the importing country in cif-values. These reflect the price of a good at the frontier of the importing country, including production costs as well as any freight charges and freight insurance premiums occurring in transport to the point where the good crosses the frontier of the importing country. Merchandise exports are usually reported by the exporting country in fob-values. They reflect the price of a good at the frontier of the exporting country, including all transport-related costs accruing until this point.

The OECD approach consists of analyzing the cif/fob-margin, i.e. the relation of the cif-fob difference to the cif-value of goods.[11] It represents the share of cross-border trade costs (before duties and taxes) in the total values of imported goods at the border of the importing country. It is thus a proxy for cross-border transport and insurance costs. A limitation for its application is the very limited number of countries worldwide that regularly report import values in both cif- and fob-terms. In their global analysis, Fiallos et al. (2024) deal with this issue by restricting the direct estimation to the sample of

7 Johansson, B., Klaesson, J., & Olsson, M. (2002). Time distances and labor market integration. Papers in regional science, 81(3), 305-327.

8 Ritter, D., Meyer, R., Koch, M., Haller, M., Bauknecht, D., & Heinemann, C. (2019). Effects of a delayed expansion of interconnector capacities in a high RES-E European electricity system. Energies, 12(16), 3098.

9 Levchenko, A. A. (2013). International trade and institutional change. The Journal of Law, Economics, & Organization, 29(5), 1145-1181.

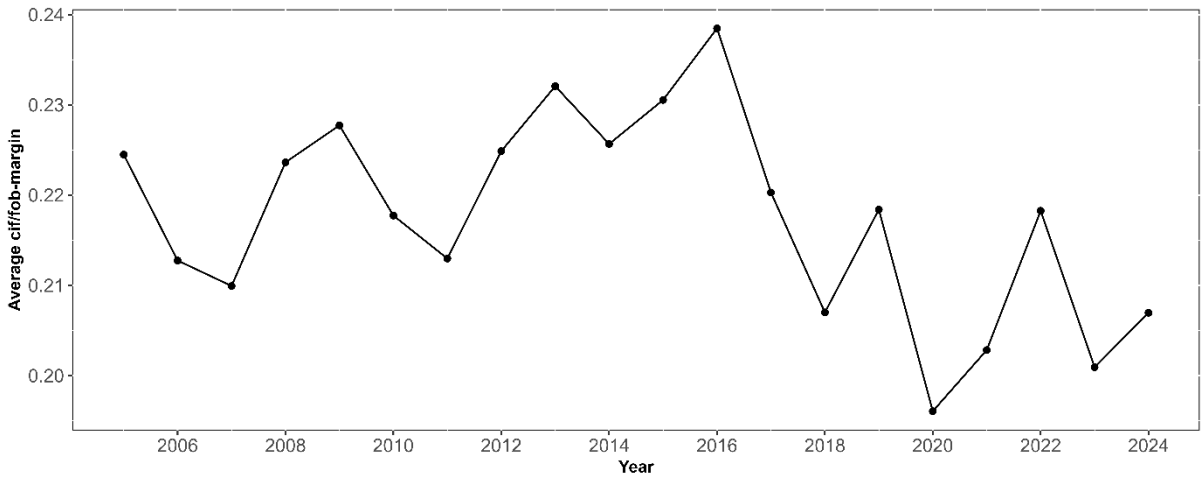
10 Fiallos, A., Liberatore, A., & Cassimon, S. (2024). CIF/FOB margins. OECD Statistics Working Papers.

11 Formula: (value_cif – value_fob) / value_cif

countries that report this data - and by using the results to estimate the margins for the remaining trade relations. For our analysis focused on EU-internal connectivity, this is not a feasible approach, as almost no EU Member States are among the reporters. The alternative, less precise approach is to draw on data from the exporter side to determine the fob-values. In what follows, we choose this variant and calculate the cif/fob-margin of a trade flow through mixed data from the importing and the exporting country, keeping in mind the generally lower level of accuracy of export data.

As a data basis, we use merchandise trade from UN Comtrade.[12] We analyze the costs of bilateral trade between the EU27 over the past twenty years (2005-2024). First, the cif/fob-margin is calculated for all country pairs and periods, drawing on import data (cif-value) and corresponding mirrored export data (fob-value). Observations with negative margins, a clear indication of measurement errors, were omitted from the subsequent analysis. Figure 1 shows the evolution of the average bilateral trade cost margins. It shows a non-linear pattern. First, margins experienced a significant decline in the years of the financial crisis (2008-2011), in parallel to the drop of EU GDP growth and trade volumes. Then, they climbed back to previous levels until the mid2010s and returned to a negative trend afterwards. This suggests some level of synchronization with the general business cycle and trade shocks. Indeed, as the trade cost margin is supposed to reflect the market values of cross-border transport and insurance, a correlation with time-variant logistics prices and freight insurance premiums is to be expected. Moreover, changes in the product mix of EU-internal trade can have an impact as well, as transport technologies and costs differ significantly between product groups. Finally, the economic situation could also influence the spatial patterns of trade, thus affecting the average transport distance.

Figure 1: Evolution of cif-/fob-margins in Intra-EU trade over time



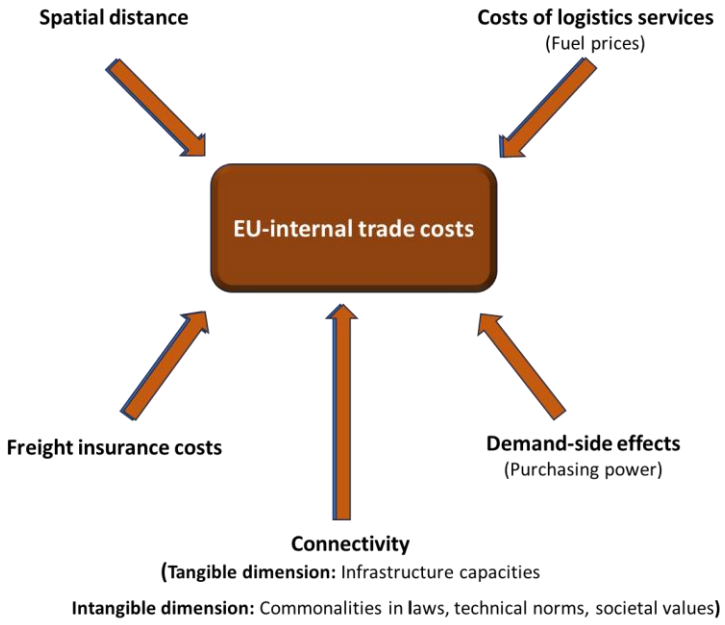
Source: UN Comtrade (2025); own calculations.

To separate these explanatory factors from the role of the connectivity, we implement a modified version of the panel regression approach in Fiallos et al. (2024). To account for changes in the product mix, we analyze EU-internal trade in twenty different key product groups characterized by especially high trade volumes (see list in Appendix). We construct a model that links the level of the cif/fob-margin in bilateral trade between two Member States as a dependent variable to the following explanatory factors: the spatial distance between the trading partners, their purchasing power, fuel prices and the level of insurance premiums. Connectivity itself is not directly captured by a variable, due to

[12] UN Comtrade (2025). UN Comtrade Database.

the lack of comparable data on cross-border infrastructure services. Instead, by controlling for the relevant influences beyond connectivity, the impact of connectivity is inferred from the residual values of the fitted panel regression model. Figure 2 illustrates our understanding of the influencing factors on EU-internal trade costs.

Figure 2: Determinants of EU-internal trade costs



Source: own illustration

Spatial distance between two Member States is measured through the population-weighted average regional distance measure provided by the Centre d'Etudes Prospectives et d'Informations Internationales (CEPII).[13] Purchasing power of exporters and importers is measured through national GDP per capita in Purchasing Power Parity taken from Eurostat.[14] Fuel prices are reflected by average annual prices of Brent crude oil, accessed through the database of the Federal Reserve Bank of St. Louis .[15] For the freight insurance premiums, no comparable time series data is available. However, the literature points to a general economic relation between insurance premiums and the level of long-term interest rates for safe assets, reflecting the traditional focus of insurance companies on a secure long-term investment of their premium revenues.[16] Therefore, we specify the interest rate on AAA-rated euro area long-term government bonds with 5-year maturity[17] as provided by Eurostat as a (time-variant) proxy.[18] In addition, we introduce a common border dummy from the CEPII database as well as a COVID-dummy for 2020 (reflecting the pandemic-driven disturbances in logistics chains). Moreover, exporter fixed effects are added to capture the effects of potential systematic reporting issues with export data in specific countries. Finally, a linear time trend variable is supposed to capture the overall

13 CEPII (2025). GeoDist. Centre d'Etudes Prospectives et d'Informations Internationales.
14 Eurostat (2025a). Purchasing power adjusted GDP per capita.
15 FRED (2025). Crude Oil Prices: Brent – Europe.
16 Doherty, N. A., & Garven, J. R. (1995). Insurance cycles: Interest rates and the capacity constraint model. Journal of Business, 383-404.
17 Other maturities within the same range have been tested without leading to significant deviations in the estimation results.
18 Eurostat (2025b). Euro yield curves - annual data.

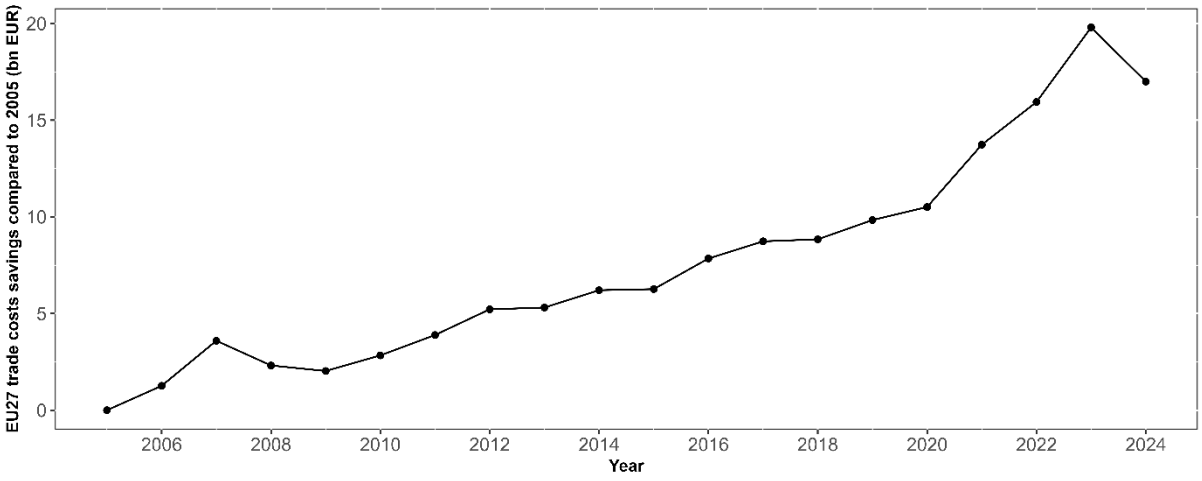
cross-country trend in EU-internal connectivity. The assumed functional relationship is in log-log form (see Appendix), adopted from the standard trade flow regressions in the gravity literature.

2.2.2 Results

The detailed regression results are reported in the Appendix.[19] Three model variants were distinguished: a full model and alternative specifications without the oil price and the COVID dummy, respectively. The coefficients of distance, interest rate and the common border dummy are statistically significant and exhibit their theoretically expected signs in all model variants. The coefficients of GDP are only significant on the side of importers, potentially because the impact of systematic differences in prosperity-related exporter characteristics is largely captured by the exporter fixed effects. Product fixed effects are highly significant throughout.

Most importantly, the coefficient of the time trend variable is highly significant and negative. **This suggests a systematic decline in connectivity-related trade costs over the past twenty years. However, the scale of this effect is very limited. It amounts to only 0.2%[20] per year in model variant I**. Figure 3 shows the implication of this figure for absolute annual trade cost savings compared to 2005 in the EU27, under the (artificial) assumption that bilateral trade volumes in the respective years would have been the same without the connectivity effect. In sum, cumulated EU27-wide trade cost savings over the twenty-year period are estimated to amount to 148 billion EUR. When viewed in relation to the overall volume of intra-EU merchandise trade (2024: 4 trillion EUR), this appears to be a small figure.

Figure 3: Impact of increased connectivity on EU-internal trade costs over time



Source: own calculations

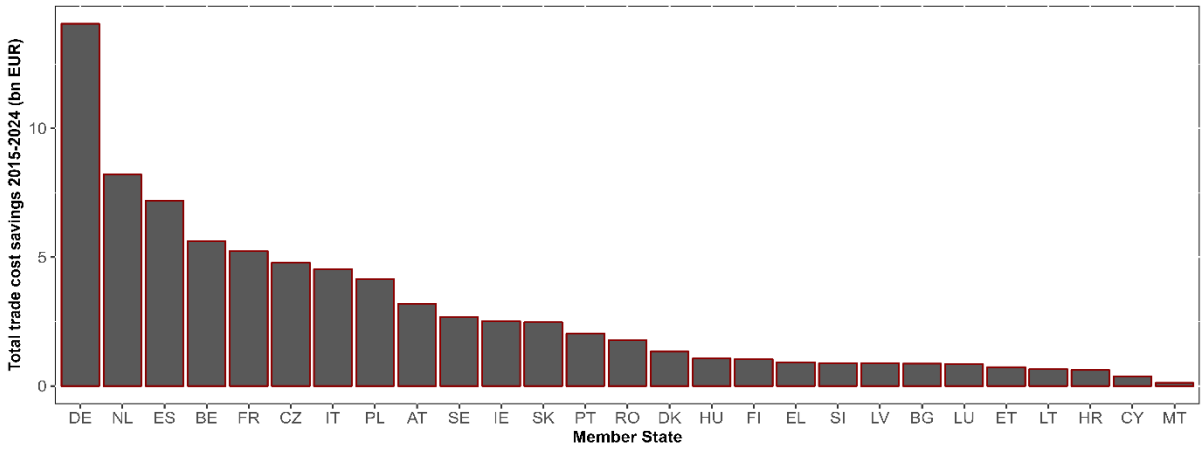
In addition, the results of our analysis allow for a country comparison of connectivity-induced cost savings over time. To this end, the time trend and the country-specific residuals from the regression are combined to estimate the effect on country-specific trade costs (see formula in Appendix). Figures 4 and 5 depict the resulting cumulative cost savings over the past ten years in absolute and per capita terms, respectively. **As expected, Germany, the largest exporter, benefited the most from connectivity improvements in absolute terms, followed by the Netherlands and Spain**. However, in per capita

[19] The estimations were carried out in the software R, using the Nonlinear Least Squares (NLS) estimator with robust standard errors.

[20] $(\exp(-0.002) - 1) * 100 \approx -0.2$

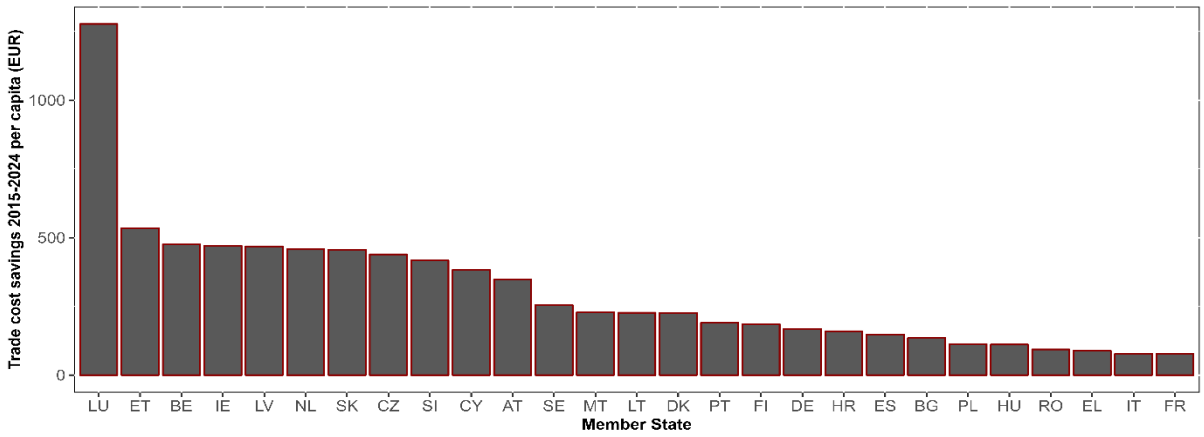
terms, it is estimated that small EU economies benefited the most. Besides the outlier Luxembourg, this includes Estonia, Belgium and Ireland. Most of the large economies are at the bottom of this ranking, with France and Italy at the very bottom (detailed results in Appendix). In relative terms, the largest connectivity-induced cost savings between 2015 and 2024 were realized by four Eastern Member States: Latvia, Lithuania, Croatia and the Czech Republic. At the other end of the spectrum, France, Denmark and Hungary experienced the smallest percentage cost effects. It should be noted that these figures only reflect the direct trade cost effects of connectivity and not its additional medium- to long-term benefits discussed in Section 2.1. Nevertheless, given the EU's long-standing commitment to strengthening internal connectivity, the small magnitude of these past effects is sobering. This calls for closer examination of existing investment barriers and the tools to overcome them.

Figure 4: Connectivity effect across Member States in 2015-2024 (total)



Source: own calculations

Figure 5: Connectivity effect across Member States in 2015-2024 (per capita)



Source: own calculations

3 The economics of cross-border infrastructure investments

3.1 Cross-border infrastructure investments and economic growth

The relationship between infrastructure investment and general economic growth has been the subject of intensive research for some time. In addition to the immediate demand stimulus provided by infrastructure spending, the literature has also found evidence of positive long-term supply-side effects. In a seminal paper, Aschauer (1989) showed that the stock of non-military public capital is an important determinant of macroeconomic productivity.[21] Core infrastructure, such as highways, streets and water systems, is of central importance. By reducing interregional trade costs, positive growth spillover effects from trade are unleashed. The significance of this effect for the EU was recently confirmed by Shevtsova et al. (2025).[22] Barro (1990) points out the complementarity between private and public capital.[23] Productive government expenditures can stimulate private capital accumulation and thus long-term growth. Other studies also highlight the contribution of public infrastructure investments to reducing economic inequality within countries.[24] It improves access to central markets for people and capital in economically deprived regions, thereby helping to overcome regional poverty traps.

Cross-border infrastructure plays a specific role. For the purposes of this text, we define cross-border infrastructure as the total capacity of infrastructure that facilitates the exchange of goods, services, capital and labor between Member States, i.e. infrastructure that contributes to the four freedoms of the internal market. This includes infrastructure that physically crosses Member State borders, such as roads, railways, ICT networks and electricity lines, as well as infrastructure intended for cross-border use located within a specific Member State, such as data centers, research laboratories and test facilities. They mainly operate through enhancing EU internal connectivity, thereby realizing the positive effects discussed in Section 2.1. Due to data limitations, only a few empirical studies have explicitly analyzed the macroeconomic effects of cross-border infrastructure. The existing studies focus on regional effects in border regions. In this respect, economic trade theory, particularly the New Economic Geography (NEG) literature, predicts that the benefits of strengthening cross-border infrastructure will be distributed asymmetrically. The region with the larger local market and higher level of economic development is expected to reap most of the benefits due to the agglomeration effect of lowered interregional trade costs.[25]

However, empirical evidence shows that this is not necessarily the case. For instance, Warr et al. (2010) identify positive welfare effects of a large-scale bridge project between Thailand and Largos for regions on both sides of the border.[26] For the EU, Basboga (2020) has shown that cross-border cooperation through the EU INTERREG program has been associated with significant positive economic growth

[21] Aschauer, D. A. (1989). Is public expenditure productive? Journal of monetary economics, 23(2), 177-200.
[22] Shevtsova, Y., Díaz-Lanchas, J., Persyn, D., & Mandras, G. (2025). Trade spillover effects of transport infrastructure investments: a structural gravity analysis for EU regions. Regional Studies, 59(1), 2441231.
[23] Barro, R. J. (1990). Government spending in a simple model of endogenous growth. Journal of political economy, 98(5, Part 2), S103-S125.
[24] Calderón, C., & Servén, L. (2004). The Effects of Infrastructure Development on Growth and Income Distribution. World Bank Policy Research Working Paper 3400.
[25] Ottaviano, G. (2003). Regional policy in the global economy: Insights from New Economic Geography. Regional Studies, 37(6-7), 665-673.
[26] Warr, P., Menon, J., & Yusuf, A. A. (2010). Regional economic impacts of large projects: a general equilibrium application to cross-border infrastructure. Asian Development Review, 27(01), 104-134.

effects for all the regions involved.[27] Existing evidence also points to a positive contribution of joint infrastructure to knowledge transfer. For instance, Kirschning and Mrożewski (2024) documented a significant role of both physical and digital infrastructure for knowledge spillover mechanisms.[28]

At the same time, the literature indicates that border effects still represent an obstacle to realizing the full gains from cross-border infrastructure in the EU.[29] Beside regulatory discrepancies between national markets, these also comprise cultural (national institutions) and socioeconomic differences (consumer preferences) that are hard to overcome in the short-term.[30] This, in turn, has repercussions on public and private investment behavior, which requires a careful analysis of economic incentives.

3.2 Incentives and investment barriers

In many cases, cross-border infrastructure services cannot be classified as either purely private or purely public goods in an economic sense. **Transport infrastructure such as cross-border roads is often best described as a club good**: citizens on both sides of the border consume the service in a non-rivalrous manner, while exclusion can be enforced through toll systems. Other forms of cross-border infrastructure could be rivalrous due to limitations in firm capacity. This is particularly true of cross-border energy networks in the EU. Energy transport infrastructure represents a special case in other respects too. The dominance of fixed costs over variable costs in transport means that these infrastructure services resemble natural monopolies. In order to avoid welfare losses through excessive transmission fees, instruments for public revenue regulation are required. In summary, the nature of cross-border infrastructure services implies a preference for cooperation between regions and different stakeholder groups, involving the definition of operational rules and financing.

The specific incentive situations of private and public actors add to the complexity. From the perspective of public actors on different sides of a border, expanding cross-border infrastructure constitutes a coordination challenge. The following assumes that public decision-makers in different countries or regions aim to maximize the contribution of cross-border infrastructure to the well-being of their respective citizens; that is to say, potential principal-agent problems are not considered. Under these conditions, the quality of the infrastructure good depends on the contributions of the bordering countries.

As Fujimura (2004)[31] pointed out, the nature of this dependence differs among infrastructure technologies. **For instance, in the case of infrastructure for maritime shipping, one can speak of a "best-shot" technology**. If a country decides to build a large seaport, neighboring countries can also benefit from increased hinterland trade. However, replicating similar harbor infrastructure in neighboring countries would mainly lead to trade diversion rather than further trade creation. Therefore, the

[27] Basboga, K. (2020). The role of open borders and cross-border cooperation in regional growth across Europe. Regional Studies, Regional Science, 7(1), 532-549.

[28] Kirschning, R., & Mrożewski, M. (2024). Revisiting the knowledge spillover paradox: the impact of infrastructure. Small Business Economics, 63(1), 1-20.

[29] Capello, R., Caragliu, A., & Fratesi, U. (2018). Measuring border effects in European cross-border regions. Regional Studies, 52(7), 986-996.

[30] Rietveld, P. (2012). Barrier effects of borders: Implications for border-crossing infrastructures. European Journal of Transport and Infrastructure Research, 12(2).

[31] Fujimura, M. (2004). Cross-border transport infrastructure, regional integration and development (No. 16). ADBI Discussion Paper.

quality of the infrastructure good is determined solely by the contribution of the country investing the most. Other examples of such technologies include large-scale energy storage and data centers.

The opposite to this is described by Sandler (2002)[32] as "weakest-link" technology. In this case, the contributions of individual countries are highly complementary. The quality of the infrastructure good for all countries involved depends entirely on the smallest contribution made. Examples of this include the creation of new cross-border motorway and railway connections to strengthen mutual trade and mobility, particularly in regions with limited transport options. The most extreme example of 'weakest-link' technology is transport infrastructure for hard-to-store energy carriers, particularly electricity grids. In this case, insufficient investment by one country reduces trade opportunities and endangers supply security on both sides of the border. This creates the risk of significant economic damage extending beyond the sectors immediately affected.

This has significant implications for the incentives of public decision-makers. **For 'best-shot' infrastructure technologies, a specific obstacle to optimal provision lies in the strong incentives for free-riding**. To conserve their own resources, countries could wait for their neighbors to make significant investments. With 'weakest-link' technologies, however, no such problems are expected to occur. There is no opportunity for free-riding, as the costs of inaction are fully internalized. Country-specific financing problems also tend to be less of an issue with 'weakest-link' technologies, as richer partner countries naturally have an incentive to support weaker partners in financing. **In this case, the main obstacle lies in coordination costs**. To avoid wasting resources, partner countries must agree in advance on an optimal provision level and the necessary financing arrangements.

Consequently, the question of whether partner countries are symmetrical or asymmetrical in terms of their economic size is also likely to play an important role. For 'best-shot' technologies, a scenario in which neighboring countries differ significantly in economic strength should be associated with lower free-riding risks, since it is clear that the investment impulse would have to come from the richer country. However, for 'weakest-link' technologies, strong asymmetry in economic development could exacerbate coordination issues, as countries would differ in the benefits expected from a joint infrastructure project.

Drawing on private capital can remedy both regional free-riding and coordination issues. Unlike public entities, private investors' decision-making will not be guided by the expected benefits to the population or the state budget on just one side of the border, but by returns on the infrastructure project as a whole. This requires that these returns can be internalized by the investor through operational revenues, thereby avoiding a gap between private and social returns. As excludability applies to typical forms of cross-border infrastructure, such internalization can be technically enforced through usage fees, provided there are no legal restrictions on both sides of the border.

However, there are still specific barriers that can deter private investors from cross-border infrastructure investments. One reason for this is that the operation of infrastructure generally tends to be heavily regulated, with strict requirements regarding access conditions and usage fees. This is particularly true of infrastructure characterized by high investment needs but low variable usage costs, giving it the nature of a natural monopoly. Although revenue regulation is socially desirable in such cases, it still reduces the maximum revenue base for private investors. Moreover, it exposes them to specific

[32] Sandler, T. (2002). Financing international public goods. In International public goods: Incentives, measurement, and financing (pp. 81-117). Boston, MA: Springer US.

long-term regulatory risks. In particular, this concerns the risk of sudden changes to revenue regulation in the future, or an inadequate regulatory response to changes in the technological landscape.

Further specific costs and risks are associated with the planning and approval stages of projects. **Large-scale infrastructure projects involve lengthy and resource-intensive permit granting processes**. During the planning stage, political guidelines and priorities may change, resulting in further delays and costly adjustments. Additional risks arise for greenfield investments in new forms of infrastructure designed for emerging technologies (e.g. hydrogen or CO_2 pipelines). The lack of an established market environment puts these investments at high risk of loss of revenue. Regulatory requirements for infrastructure operation are still in a trial-and-error phase, which increases the risk of abrupt changes. Furthermore, the simultaneous development of infrastructure and production capacity can lead to chicken-and-egg problems, encouraging a wait-and-see approach among investors.[33] **For cross-border infrastructure in particular, many of these risks are amplified, as their business models depends on the market development and regulatory convergence in multiple countries.**

In sum, this depresses the private economic returns by raising financing costs. In particular, it limits the opportunity for investors to separate such projects from their balance sheet portfolio through project finance instruments. This, in turn, eliminates an important channel to distribute project risks among a wider range of small-scale investors.[34] These arguments further emphasize the importance of close public-private cooperation in cross-border infrastructure development. Specifically, public-private partnerships in project financing present an opportunity to reduce costs by sharing risk with the public sector. Furthermore, they demonstrate a clear commitment from the public sector, thereby reducing the perceived regulatory risks for private investors.

3.3 Most relevant barriers for private investors in the EU

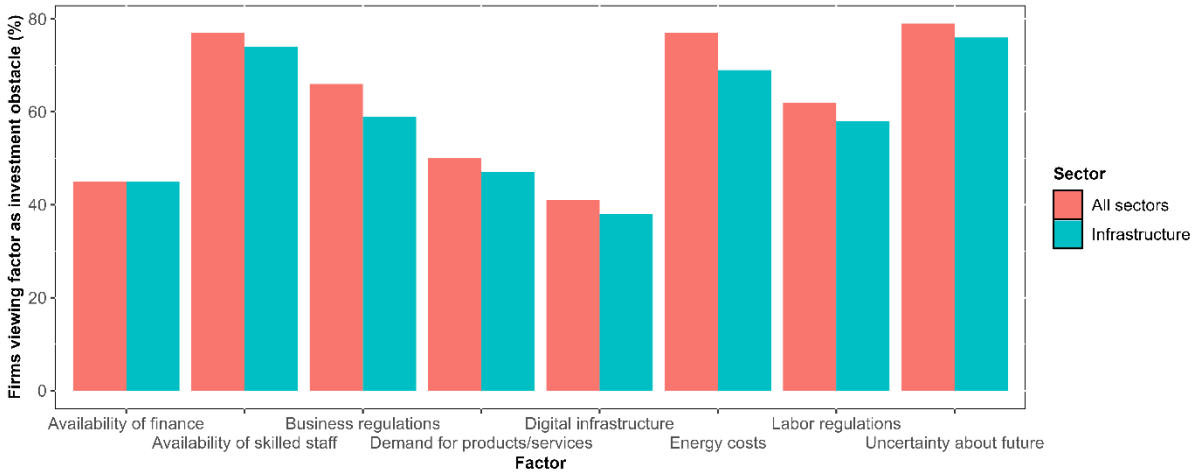
Through its large-scale investment surveys, the European Investment Bank (EIB) regularly provides an overview of the climate for private investment in the EU, comparing it to the situation in the USA. In these surveys, infrastructure is reported as a distinct investment sector. A key finding of the most recent survey (2024) is that EU firms currently allocate a smaller proportion of their investments to physical infrastructure than their US counterparts (14% versus 24%).[35] Among EU firms' investments in infrastructure, only 26% of funds are currently spent on capacity expansion, also a smaller share than measured for US firms (32%). A more drastic discrepancy is observed for the expected share of capacity expansion in the upcoming three years (24% in the EU vs. 42% in the US).

In terms of financing, firms in the infrastructure sector stand out for their reliance on external sources (49% vs. 42% of all EU firms). In quantitative terms, external capital also made up a larger share of infrastructure projects (32%) than the EU average (25%). This reflects the economic and legal complexity of infrastructure assets, as well as the role of public capital in cooperation arrangements, discussed above. **With regard to investment constraints, firms in the infrastructure sector most frequently identified general uncertainty about the future as an obstacle** (see Figure 6), followed by restrictions in skill supply. Regarding near-term development, firms were especially skeptical about the regulatory framework in 2024. A clear majority expected a worsening of the political and regulatory climate within

[33] Wolf, A. (2023). A bank to boost renewable hydrogen. cepInput No.13/2023.
[34] Kurniawan, F., Mudjanarko, S. W., & Ogunlana, S. (2015). Best practice for financial models of PPP projects. Procedia Engineering, 125, 124-132.
[35] EIB (2024). EIB Investment Survey European Union 2024. European Investment Bank.

one year. A focus on regulatory issues is also evident in the survey results on the external risks from international trade. Compliance with new regulations was the most frequently mentioned obstacle in relation to international trade (49% of firms in the infrastructure sector). **These results demonstrate the high sensitivity of infrastructure investment to regulatory framework conditions**. Therefore, a European Infrastructure Union requires more than just an ambitious public financing plan; it requires a stable support framework at EU level.

Figure 6: Investment obstacles identified by EU infrastructure companies in 2024



Source: EIB (2024); own illustration

4 EU instruments to support cross-border infrastructure projects

4.1 Coordination of project planning

The necessity to coordinate national infrastructure planning was recognized by the European Union already in the 1990s. First attempts in this direction took the form of Community Guidelines for the development of a Trans-European Transport Network (TEN-T).[36] Right from the beginning, this was coupled with the identification of a range of priority projects to improve cross-border connectivity. In the subsequent period, the guidelines were extended through amendments, reflecting the new requirements imposed by the EU enlargement process. In 2013, the definition and objectives of TEN-T were made subject of an EU Regulation[37] and subsequently updated in 2024.[38] In its present form, the legal objective is to establish a single multimodal transport network of high quality, which helps to create a European Transport Area. This area is characterized by the attributes “safe, sustainable, efficient and resilient”. This demonstrates the strong alignment of infrastructure policies with the wider economic and climate policy objectives of the EU. Consequently, infrastructure planning shall not only remove bottlenecks in existing cross-border transport systems, but also support the uptake of low-emission mobility. To guide the development, the TEN-T Regulation defines a strategy involving three

[36] European Union (1996). Decision No 1692/96/EC of the European Parliament and of the Council of 23 July 1996 on Community guidelines for the development of the trans-European transport network.

[37] European Union (2013a). Regulation (EU) No 1315/2013 of the European Parliament and of the Council of 11 December 2013 on Union guidelines for the development of the trans-European transport network and repealing Decision No 661/2010/EU.

[38] European Union (2024a). Regulation (EU) 2024/1679 of the European Parliament and of the Council of 13 June 2024 on Union guidelines for the development of the trans-European transport network, amending Regulations (EU) 2021/1153 and (EU) No 913/2010 and repealing Regulation (EU) No 1315/2013.

stages: the completion of a core network by 2030, of an extended core network by 2040 and finally of a comprehensive network by 2050. Transport infrastructure projects within these areas shall be developed with priority. In addition, the Regulation defines nine specific European Transport Corridors as part of the core or extended core network that are assigned the highest strategic importance.

The EU's ambition to establish European networks has also pretty early on addressed the area of energy infrastructure, again first in the form of guidelines. In 2013, a Regulation defining steps to the development of priority corridors for a Trans-European Energy Network (TEN-E) entered into force.[39] By strengthening interconnections, it aimed to reduce physical barriers to cross-border energy markets and improve the EU's overall security of energy supply. The rules were updated by a Regulation in 2022, to reflect the goals of the European Green Deals and the resulting more pressing needs for energy system integration.[40] The present TEN-E Regulation defines spatial priority corridors for electricity interconnections, offshore grids and hydrogen infrastructure. Moreover, it defines three general thematic priority areas. Beside smart electricity grids and smart grids, this includes the development of a CO_2 transport infrastructure. Energy infrastructure projects that belong to the priority corridors or areas can qualify for a priority status (see next Subsection).

4.2 Prioritization of projects

One concrete instrument to speed up planning and implementation of strategically important cross-border projects in energy infrastructure is their recognition as **Projects of Common Interest (PCI)**. To select PCIs, a bottom-up system is established by the TEN-E regulation. It consists of a selection of projects by single regional stakeholder groups established for each priority corridor and thematic focus area (see previous Subsection). In these groups, the respective Member States and the Commission shall make decisions in a consensual manner. Suitable projects shall be necessary for the implementation of the respective corridors or areas, exhibit a positive benefit-cost balance and should exert significant cross-border impacts. Recognized PCIs are summarized in a Union list is established every two years, with the first one released in 2013. The current Union list was published in 2023 as part of a Commission Delegated Regulation, including a total of 97 different projects for the single corridors and thematic areas.[41]

Being recognized as a PCI comes with several benefits. Firstly, to speed up implementation, a timetable for the single project stages is to be set up and progress to be regularly monitored by monitoring reports, including an investigation of reasons for potential delays and ways to overcome them. Secondly, if a project meets significant difficulties, the Commission may nominate a European coordinator whose task is to assist the stakeholders in project implementation. Thirdly, PCIs are granted a priority status in permit granting. Specifically, in national permitting, project shall be granted the highest status of significance foreseen in the national law. All judicial processes associated with a PCI shall be treated in the most urgent manner. To reduce transaction costs in permit granting, Member States shall

[39] European Union (2013b). Regulation (EU) No 347/2013 of the European Parliament and of the Council of 17 April 2013 on guidelines for trans-European energy infrastructure and repealing Decision No 1364/2006/EC and amending Regulations (EC) No 713/2009, (EC) No 714/2009 and (EC) No 715/2009

[40] European Union (2022). Regulation (EU) 2022/869 of the European Parliament and of the Council of 30 May 2022 on guidelines for trans-European energy infrastructure, amending Regulations (EC) No 715/2009, (EU) 2019/942 and (EU) 2019/943 and Directives 2009/73/EC and (EU) 2019/944, and repealing Regulation (EU) No 347/2013

[41] European Union (2024b). Commission Delegated Regulation (EU) 2024/1041 of 28 November 2023 amending Regulation (EU) 2022/869 of the European Parliament and of the Council as regards the Union list of projects of common interest and projects of mutual interest

designate a single authority to the function of a coordinator, which is the only point of contact for project promoters ("One-stop Shop"). For the length of permit granting processes, time limits are defined, differentiating between the pre-application procedure (24 months) and the statutory permit granting procedure (18 months). Moreover, PCIs can apply for public financial support by the EU Connecting Europe Facility (see next Subsection).

Public support for cross-border infrastructure investments can also be granted by the **Important Projects of Common European Interest (IPCEIs)** instrument.[42] These are investment projects that are financially supported by several Member States and are expected to contribute to sustainable economic growth and industrial competitiveness in the EU. IPCEIs that have been recognized by the European Commission are considered to be compatible with the principles of the internal market and European state aid rules. This gives Member States greater scope for state aid than they would have with purely national projects. Recognition is subject to a number of clearly defined criteria. Among other things, projects must have positive spillover effects on the EU economy as a whole, i.e. extending beyond the participating Member States. Financing must not consist solely of subsidies, but must also include co-financing from the companies and other institutions involved. They must also contribute to significant technological progress.[43]

4.3 Financial support

The traditional vehicle of the EU to support European infrastructure development is the EU Cohesion Policy. In the current 2021–2027 Multiannual Financial Framework, a total of 392 billion EUR is devoted to cohesion-focused projects, split across four EU Funds.[44] Among these, the **European Regional Development Fund** (ERDF) and the **Cohesion Fund** (CF) are of particular relevance for infrastructure investments. For the ERDF, improving connectivity by enhancing mobility is one of five current funding priorities.[45] To support cooperation across regions and countries, the ERDF finances dedicated Interreg programs with a budget of almost 10 billion EUR in 2021-2027, 6.5 billion Euro of which are granted to cross-border projects.[46] The CF is an instrument specifically for supporting the development of low-income Member States. Projects in Member States with a national gross income per capita below 90% of the EU average are eligible for funding. In the current period 2021-2027, one of the two dedicated tasks of the Cohesion Fund is to promote trans-European networks in the area of transport infrastructure, in close alignment with the priorities identified by the TEN-T Regulation (see Subsection 4.1). Financing occurs in shared responsibility between Commission and Member States, with Member States selecting and monitoring the single projects.[47]

Moreover, during the 2014-2020 financing period, the EU introduced dedicated funds for supporting cross-border infrastructure network under the umbrella of the **Connecting Europe Facility** (CEF). Its purpose is to finance the development and modernization of trans-European network infrastructure in the segments transport, energy and digital services. In the current period 2021-2027, 33.72 billion EUR funding are allocated to the CEF, 60% of which are required to contribute to climate objectives.

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[42] European Commission (2025c). Practical information for Important Projects of Common European Interest (IPCEI).

[43] European Commission (2021). Communication from the Commission Criteria for the analysis of the compatibility with the internal market of State aid to promote the execution of important projects of common European interest 2021/C 528/02.

[44] European Commission (2025d). Available budget of Cohesion Policy 2021-2027.

[45] European Commission (2025e). European Regional Development Fund.

[46] European Commission (2025f). Interreg: European Territorial Co-operation.

[47] European Union (2021a). Regulation (EU) 2021/1058 of the European Parliament and of the Council of 24 June 2021 on the European Regional Development Fund and on the Cohesion Fund.

The lion's share goes to the CEF transport (25.81 billion EUR). Funding can be provided in the form of grants, but also through more innovative instruments like guarantees and project bonds.[48] The CEF is implemented through multiannual work programs. These programs include timetables for the publication of calls for project proposals, each with its dedicated infrastructure objective. For the selection of projects in these calls, sector-specific rules apply. For instance, for energy projects, the recognition of projects as a PCI (see Subsection 4.2) is a prerequisite for funding. After the completion of each call, the financing provided to the selected projects and the conditions defined for their implementation are specified in dedicated Implementing Acts.[49]

Finally, an alternative source of decentral financing is support by EIB. The EIB provides funding in the form of various instruments such as loans, guarantees and equity instruments to large-scale projects, including Public-Private Partnerships in infrastructure expansion.[50]

5 Current priorities in cross-border infrastructure cooperation

5.1 Transport infrastructure

As a result of the 2024 Call for Proposals, a total of 2.84 billion EUR of funds from the CEF (see Subsection 4.3) have been allocated to transport projects. Among the 94 projects promoted, the EU has set a specific focus on railway connections. 77% of the total funding goes to projects for extending or upgrading cross-border railway lines.[51] This in line with the EU's objective to link infrastructure and climate policies, specifically with the precondition to earmark 60% of the CEF funds for climate objectives. Prestigious examples include *Rail Baltica*, a project that will integrate the Baltic States into the European railway network, establishing a link from Tallinn over Riga and Kaunas to Warsaw. It will construct the first large-scale railway network with European standard gauge in the region, replacing the so far dominating Russian gauge.[52] Besides creation of transport capacity, another focus of railway funding is improving infrastructure management. 32 funded projects take part in the implementation of the *European Rail Traffic Management System* (ERTMS). The ERTMS is a single European signaling and speed control system. It shall strengthen the interoperability of national railway systems, improving rail safety and lowering purchasing costs for equipment through creating a joint market.[53] In the segment of maritime infrastructure, a support function to the overarching EU climate and digitalization goals is apparent as well. A range of ports receives CEF funding for building shoreside electricity charging stations for ships, contributing to a reduction of landside emissions. Further funding is provided to projects introducing new digital traffic management systems for waterborne transport. Finally, in road and air transport, a digitalization focus is recognizable as well, involving the promotion of intelligent transport management systems.[54]

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48 European Commission (2025g). About the Connecting Europe Facility.

49 European Union (2021b). Regulation (EU) 2021/1153 of the European Parliament and of the Council of 7 July 2021 establishing the Connecting Europe Facility and repealing Regulations (EU) No 1316/2013 and (EU) No 283/2014.

50 EIB (2024). EIB Product Catalogue. European Investment Bank.

51 European Commission (2025h). CEF Transport: €2.8 billion in 94 projects to boost sustainable and connected mobility across Europe.

52 Rail Baltica (2025). The final step towards full European Union integration.

53 European Union Agency for Railways (2025). European Rail Traffic Management System (ERTMS).

54 European Commission (2025i). Connecting Europe Facility for Transport – List of projects selected under the 2024 calls for proposals.

5.2 Electricity grids

To monitor improvements in cross-border electricity connections, the EU has set an explicit interconnection target of at least 15% by 2030. This means, every Member State needs to ensure that its grid capacities are capable of importing at least 15% of its electricity production capacity.[55] Current progress with respect to this goal differs significantly between Member States. At the beginning of 2025, 14 countries had already fulfilled the 2030 goal, while on the other hand 8 countries still had not reached the previous 2020 target (10%).[56] To boost investments in grids, the Commission published in 2023 an EU Action Plan for Grids.[57] It announced a series of regulatory initiatives in order to achieve the goal of doubling cross-border electricity transmission capacity within the next seven years. Improved political coordination should increase the number of IPCEIs for electricity grid expansion projects and speed up their implementation. Additionally, proposals for the future structure of network charges compatible with the requirements of a smart grid are to be developed in collaboration with national regulatory authorities and network operators. This addresses two central barriers to grid investments stressed in a recent report of the European Parliament.[58] Regarding current funding priorities, the scope of funding available for electricity grids is still rather limited. The total sum allocated to CEF energy projects in the 2021-2027 period amounts to only one fifth of the sum allocated to CEF transport projects. Moreover, the sum has not been adjusted in response to the revision of the TEN-E Regulation (see Subsection 4.1), even though it extended the objectives of CEF energy to areas like smart grids and the promotion of a hydrogen and CO_2 infrastructure.

5.3 Hydrogen pipelines

Investments in an intra-European hydrogen infrastructure will initially focus on the development of a cross-border pipeline network – the so-called European Hydrogen Backbone (EHB). To this end, 33 European gas network operators have joined forces in the EHB initiative. It plans to build an EHB by 2040 consisting of five cross-border transport corridors connecting almost the entire continent with a total length of 53,000 km.[59] By 2030, 31,500 km of this network shall already be completed. The EHB initiative has provided an indicative estimate of the total investment costs, putting the figure at between 80 billion EUR and 143 billion EUR.[60] However, as inflation-related price increases were not included in this calculation, the actual costs are likely to be significantly higher.[61] To finance these investments, the EHB initiative considers state support amounting to 27.5 billion EUR necessary for the period up to 2030 alone. This applies to both the planning phase (2.5 billion EUR) and construction and operation (25 billion EUR).[62] This includes means provided by the CEF Energy Fund. As a result of the

[55] European Union (2018). Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action.

[56] European Commission (2025j). Electricity interconnection targets.

[57] European Commission (2023). Grids, the missing link - An EU Action Plan for Grids. Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. COM/2023/757 final.

[58] EPRS (2025). Briefing EU electricity grids. European Parliamentary Service.

[59] European Hydrogen Backbone Initiative (2025). The European Hydrogen Backbone (EHB) Initiative.

[60] European Hydrogen Backbone Initiative (2023). Implementation Roadmap —Cross-border projects and costs update – November 2023.

[61] Hydrogen Insight (2023). Europe's 'hydrogen backbone' of cross-border pipelines will cost billions more euros than initial estimates.

[62] European Hydrogen Backbone Initiative (2024). EHB Implementation Roadmap: Public support as catalyst for hydrogen infrastructure.

2024 Call for Proposals alone, the CEF will fund projects related to the establishment of a cross-border hydrogen infrastructure in a magnitude of 165 million EUR.[63]

5.4 ICT networks

The support to investments in European ICT networks fulfills important transversal tasks. By funding the digitalization of traffic systems and energy networks, it helps to reduce the costs of cross-border cooperation and thus contributes directly to the integration of national markets. These projects are partly funded by the CEF Transport and the CEF Energy, recognizing the transversal value of a joint digital infrastructure. Further funding is provided by the dedicated digital pillar of the CEF. As a result of the latest Call for Proposals in 2023, 53 projects have been granted funding at a total volume of about 256 million EUR.[64] A significant share of the funding is allocated to projects dealing with the deployment of the 5G Technology, in diverse areas such as transport, education and healthcare. Another focus area of funding are fixed cross-border ICT connections in the form of submarine cables, stressing the growing role of security aspects in EU infrastructure development.[65] In addition to these technologies strengthening the direct digital linkages between Member States, joint efforts of EU and Member States in the digital sphere have recently focused on flagship projects expressing the intent of the EU to catch up in terms of global digital influence and reduce its dependence on the US. One example for this is the development of an own Next Generation Cloud Infrastructure through an IPCEI involving the contribution of 12 Member States.[66] Other examples include the development of the EU's own global satellite navigation system *Galileo*[67] and the *Copernicus* program for earth observation, including ground-based and satellite data networks.[68] In 2024, the EU brought a new digital flagship, an Infrastructure for Resilience, Interconnectivity and Security by Satellite (IRIS²) under way, with the goal to provide secure and high-speed connectivity services to European citizens and companies.[69]

5.5 Research and development infrastructure

For a long time, supporting the formation of European cross-border research and development networks has been one of the key goals in EU policy-making. Besides the direct funding and steering of joint research activities through large-scale programs like Horizon Europe, this increasingly involves also involves a physical infrastructure dimension. An example for this is the promotion of open access development infrastructure in the form of so-called Open Innovation Test Beds (OITBs). These are clusters of laboratories, testing facilities and providers of innovation services, which cooperate based on a Single Point of Entry. They are envisaged to offer an accessible all-in-one solution for testing newly invented material and developing it further to industrial products. Technically, the aim is to advance from laboratory validation (Technological Readiness Level (TRL) 4) to industrial prototypes (TRL 7). They are required to be open at fair prices to any institution, including public and private organizations, industry and research. Transparent agreements on data exchange and handling of intellectual property are important preconditions. Besides the provision of infrastructures services, OTIBs are also actively

[63] European Commission (2025k). List of proposals selected for grants in the field of the trans-European energy infrastructure under the Connecting Europe Facility following the call for proposals launched on 11 April 2024.
[64] European Commission (2024a). 53 projects selected for up to €274 million under third CEF Digital calls.
[65] European Commission (2024b). Projects selected following the third calls (2023) for proposals for grants under the Connecting Europe Facility – Digital sector pursuant to Implementing Decision C(2023)2533.
[66] Federal Ministry for Economic Affairs and Energy (2025). IPCEI Next Generation Cloud Infrastructure and Services.
[67] ESA (2025). What is Galileo?. The European Space Agency.
[68] Copernicus (2025). Europe's eyes on earth.
[69] European Commission (2024c). IRIS²: the new EU Secure Satellite Constellation.

shaping the research landscape through own calls for project proposals matching the thematic field of the OITB.[70] Currently, OITBs are primarily funded by the Horizon Europe program. Recent calls have focused on key future technologies like test beds for batteries[71] or nanomaterials.[72]

6 Policy implications in light of the Commission's budget proposal

The unique economic characteristics of cross-border infrastructure pose a significant challenge to policy-making. As discussed in Section 3, they tend to be associated with high coordination requirements, incentives for regions to 'free ride', and high implementation and market risks for private investors. Investments are further confronted with multiple national regulatory regimes, which adds to investment uncertainty concerning the length and cost of public approval procedures, as well as the evolution of national market demand. Furthermore, the semi-public nature of many infrastructure services necessitates intricate economic arrangements between public and private stakeholders with regard to project financing and infrastructure operation regulation. Different cost and benefit expectations among stakeholders can lead to disputes and cause further delays.[73]

Against this backdrop, it is evident that joint infrastructure development and regulatory convergence are inextricably linked. Progress with both is mutually dependent. Convergence in technical infrastructure requirements and market rules can boost investments in cross-border projects by reducing coordination costs and market uncertainty. Conversely, improved cross-border connectivity through infrastructure investment strengthens the economic and social ties between participating countries, thereby increasing the motivation for political convergence. Due to the high technical complexity and heterogeneity of infrastructure services, regulatory harmonization can only occur gradually, as part of a long-term adjustment process. Unleashing these mutually reinforcing effects requires a twofold political approach: gradually reducing regulatory risks and politically committing to efficiently sharing the remaining risks of infrastructure investments among the relevant stakeholders.

Public financial engagement by the EU and its Member States will continue to be crucial for the latter. In this respect, **the Commission's recent proposal for the next Multiannual Financial Framework (2028–2034) sends mixed signals**.[74] On the one hand, the Commission recognizes the strategic importance of cross-border infrastructure by proposing to increase the total resources allocated to the Connecting Europe Facility (CEF) to approximately 100 billion EUR, which is a factor of 2.4 higher than the amount allocated for the 2021–2027 period. On the other hand, under the new framework, financial support for public civil infrastructure would compete with the Commission's two new policy priorities: strengthening EU defense capacities and providing direct support to EU industries under pressure from external competition. This is immediately apparent in the CEF itself, where a new pillar, 'military mobility', is to be introduced alongside energy and transport. This pillar is expected to receive around 20% of the total CEF resources. While many "dual-use" infrastructure projects may have both military and economic benefits, adding a military dimension would still affect project selection and the geography of cross-border infrastructure expansion in Europe. Concerning direct industry support, the

[70] European Commission/European Health and Digital Executive Agency (2023). Open innovation test beds – Improving access to knowledge to accelerate European innovation. Publications Office of the European Union, 2023.
[71] TEESMAT (2025). Open Innovation Test Bed for Electrochemical Energy Storage Materials.
[72] LightMe (2025). Boosting innovation in the field of lightweight metal matrix nanocomposites.
[73] EIB (2023). Cross-border infrastructure projects - The European Investment Bank's role in cross-border infrastructure projects. Report. European Investment Bank.
[74] See European Commission (2025b).

proposed new Competitiveness Fund is expected to account for a significant proportion of the EU budget (approximately 275 billion EUR, excluding Horizon Europe). This strategic shift could also directly impact infrastructure spending by favoring projects tailored to the infrastructure needs of industries that are politically prioritized.

Moreover, the fate of the support provided by the European Regional Development Fund and the Cohesion Fund for regional infrastructure development (see Subsection 4.3) is highly uncertain in light of the proposed changes to the management approach. Under the new heading 'European Fund for economic, social and territorial cohesion, agriculture and rural development, fisheries and maritime affairs, and prosperity and security', the two funds, along with 12 other existing EU funds, would be jointly managed. Allocation would be based on national and regional partnership plans, following the model of the Recovery and Resilience Facility. This is likely to create additional spending flexibility for Member States. However, given the economic incentive barriers discussed above, there is a serious risk that this would encourage underinvestment in cross-border infrastructure.

To mitigate the impact of disincentives and strengthen cross-border connectivity, we therefore recommend to align future EU infrastructure policies with the following guidelines, structured based on the single stages of a cross-border infrastructure project:

1. Project selection: Prioritize projects offering strong spatial and transformative externalities

With budget competition at both the EU and Member State levels becoming increasingly tough, allocating public infrastructure funding to projects offering the greatest long-term societal benefits should be an imperative. Apart from the defense sector's undisputed needs, this suggests prioritizing cross-border projects, as their economic impact exceeds the positive short-term effects on trade and employment in border regions. In particular, projects offering synergies with the EU's long-term policy goals of decarbonization and digitalization should continue to be favored to ensure that infrastructure supports the necessary structural changes and does not inadvertently contribute to technological lock-in. This requires further innovation in cost-benefit analyses of projects and macroeconomic policy assessment. Specifically, the EU should provide sufficient support for projects that help overcome infrastructure bottlenecks for emerging technologies, such as renewable hydrogen and carbon capture. Apart from financial support, this also includes implementing joint planning procedures and market rules for operating these new types of infrastructure.[75]

2. Financing: Offer flexible risk-sharing arrangements

When providing public financial support for cross-border infrastructure projects, the EU and Member States should be able to draw on a flexible range of financial tools that account for the variety of risk patterns specific to each project. In this respect, the EIB's flexible, hands-on approach should be adopted as a general role model. Depending on a project's risk structure and the types of investors involved, future support funds should comprise a range of instruments, from traditional tools such as grants and loans, to equity, venture capital and financial guarantees, coupled with expert consulting. At the same time, it is essential to ensure full transparency regarding their impact on long-term budget

[75] Eckhardt, P., Wolf, A. (2025). Expansion of Digital and Energy Network Infrastructures. cepStudy.

commitments and public risk exposure. In this respect, the current public information base remains scattered and fragmentary, as a recent cepStudy has demonstrated.[76]

3. Planning: Ensure involvement of all relevant stakeholders

During the planning stage, the focus should be on identifying and minimizing potential barriers to timely project implementation. This includes the possibility that stakeholder groups not directly involved in the planning process may not accept the plans. This creates the risk of delays due to legal disputes. To mitigate this risk, it is crucial to ensure the representation of relevant stakeholder groups in the TEN-T and TEN-E steering committees, and to promote transparency regarding the EU's infrastructure priorities and explain their necessity for maintaining economic prosperity during times of transition.

4. Approval: Continue efforts to streamline national approval procedures

Delays are also often caused by divergent national processes and requirements for project approval, as well as insufficient administrative resources. For example, in a 2022 survey, ACER identified permit granting processes as the most frequently mentioned reason (30%) for delays for electricity transmission projects recognized as PCIs. On average, national permit granting processes took 3.3 years, and 21 out of 92 PCIs exceeded the 3.5-year time limit set by the TEN-E Regulation (see Subsection 4.2).[77] The EU should continue its efforts to define and enforce time limits for approval procedures. For some less sensitive administrative steps, this could involve applying the principle of tacit approval, as has already been introduced for the deployment of renewable energy in dedicated areas.[78] At the same time, stronger pressure from the EU should be coupled with increased support to help national and regional administrations overcome capacity and modernization bottlenecks.

5. Implementation: Commit to a stable regulatory market environment

In addition to the ongoing efforts to harmonize national market rules, a clear commitment to the long-term stability of these rules is equally important from a political standpoint. For investors in capital-intensive, long-term infrastructure projects, regulatory uncertainty is especially deterrent, as recent investor surveys have shown (see Subsection 3.3). In this respect, repeated realignment of strategic EU policy objectives and ongoing debate on support instruments are counterproductive for the investment environment. It is therefore all the more important that, in the upcoming budget negotiations, the EU and its Member States make it clear that connectivity and infrastructure support are pivotal for future European prosperity, regardless of their individual positions in ideological disputes on climate and industrial policies.

[76] Küsters, A., Wolf, A. (2025). State Aid for Clean Technologies in the EU. cepStudy.

[77] ACER (2022). Consolidated report on the progress of electricity and gas Projects of Common Interest. European Union Agency for the Cooperation of Energy Regulators.

[78] European Union (2023). Directive (EU) 2023/2413 of the European Parliament and of the Council of 18 October 2023 amending Directive (EU) 2018/2001, Regulation (EU) 2018/1999 and Directive 98/70/EC as regards the promotion of energy from renewable sources, and repealing Council Directive (EU) 2015/652.

7 Conclusion

With views on the EU's political future increasingly drifting apart, policy-makers are well-advised to refocus their efforts on the EU's traditional core task: strengthening connectivity as an engine for joint economic growth. The expansion and modernization of cross-border infrastructure must regain a priority status. Even though the EU has long pursued a policy of promoting infrastructure development, the macroeconomic impact of these instruments remains limited, as our estimates of EU-internal trade costs suggest. Given that Europe is unlikely to become competitive with other world regions in terms of labor and energy costs in the foreseeable future, the EU cannot afford to leave the connectivity potential untapped. Added to this are the new technological requirements posed by the green and digital transformations, requiring additional greenfield investments in new forms of cross-border infrastructure.

The EU should respond with a targeted investment offensive to overcome connectivity barriers. Such a program must not be limited to raising impressive amounts of funding. The economic specificity of infrastructure and the complex regulatory environment require a carefully balanced approach between the interests of public and private stakeholders, as well as efficient forms of risk sharing. Policy-makers must therefore combine clear priorities in the selection of funding with sufficient flexibility - and a willingness to innovate in the choice of funding instruments. Moreover, strengthening infrastructure capacities must go hand in hand with increased efforts to remove regulatory connectivity barriers. The legal framework created for the transport and trade of hydrogen is one example of this.

The EU financial framework adopted for the 2028–2034 funding period will have a significant influence on the future priorities in this area. The upgrading of civil infrastructure is competing with new policy objectives, such as strengthening defense readiness and providing direct support to selected industries. Due to limited resources and the specific incentive barriers to infrastructure investment, there is a real risk that cross-border civil infrastructure will be neglected in future EU and Member State funding policies. The additional flexibilities envisaged by the Commission's financial framework proposal could further reinforce this trend. This makes it all the more important to emphasize the central importance of joint infrastructure in the EU's all-encompassing strategy debate.

8 Appendix

8.1 List of product groups covered by the trade cost analysis

HS-Code	Name of product group	HS-Code	Name of product group
27	Mineral fuels	68	Articles of stone, plaster and cement
28	Inorganic chemicals	70	Glass and glassware
29	Organic chemicals	72	Iron and steel
30	Pharmaceutical products	74	Copper and copper articles
31	Fertilisers	76	Aluminium and aluminium articles
39	Plastics and plastic articles	84	Machinery
40	Rubber and rubber articles	85	Electric equipment
44	Wood and wood articles	87	Non-railway vehicles (automotive)
48	Paper and paperboard	88	Aircraft and spacecraft
49	Printed products	89	Ships and boats

8.2 Model and data

Structure of regression model:

$$\ln margin_{ijpt} = \beta_0 + \beta_1 \cdot \ln dist_{ij} + \beta_2 \cdot \ln GDPex_{it} + \beta_3 \cdot \ln GDPim_{jt} + \beta_4 \cdot \ln oil_t + \beta_5 \cdot int_t + \beta_6 \cdot contig_{ij} + \beta_7 \cdot covid_t + \beta_8 \cdot t + \gamma_i + \delta_p + \varepsilon_{ijpt}$$

i: exporting country
j: importing country
p: product group
t: time period (year)

Variable	Meaning	Source
margin	cif-/fob-margin of product-specific trade between two Member States	UN Comtrade (2025); own calculations
dist	Population-weighted average distance between regions of the trading Member States	CEPII (2025)
GDP_{ex}	Purchasing power adjusted GDP of exporting country per capita	Eurostat (2025a)
GDP_{im}	Purchasing power adjusted GDP of importing country per capita	Eurostat (2025a)
oil	Annual averages of crude oil prices (Brent)	FRED (2025)
int	Interest rate on AAA-rated euro area long-term government bonds with 5-year maturity	Eurostat (2025b)
contig	Dummy variable for the existence of a common border between the trading Member States (1=yes)	CEPII (2025)
covid	Dummy variable for the year 2020	-
γ	Exporter fixed effect	-
δ	Product fixed effect	-

8.3 Regression results

	Dependent variable: *ln(margin)*								
	Model variant I			Model variant II			Model variant III		
Regressor	**Estimate**	**Std. error**	**p-value**	**Estimate**	**Std. error**	**p-value**	**Estimate**	**Std. error**	**p-value**
Intercept	1.862	1.632	0.103	1.925	1.733	0.083.	1.968	1.742	0.081.
ln(dist)	0.183	34.901	0.000***	0.183	34.901	0.000***	0.183	34.903	0.000***
$ln(GDP_{ex})$	0.015	0.694	0.488	0.016	0.734	0.463	0.016	0.748	0.455
$ln(GDP_{ex})$	0.014	3.922	0.000***	0.014	3.929	0.000***	0.014	3.933	0.000***
ln(oil)	-0.002	-0.243	0.808				0.000	0.023	0.981
int	-0.006	-3.255	0.001**	-0.006	-3.560	0.000***	-0.006	-3.231	0.001**
trend	-0.002	-3.369	0.001***	-0.002	-3.547	0.000***	-0.002	-3.508	0.000***
contig	-0.213	-16.327	0.000***	-0.213	-16.327	0.000***	-0.213	-16.329	0.000***
covid	-0.007	-0.669	0.504	-0.006	-0.623	0.533			
cmdCode28	-0.062	-5.558	0.000***	-0.062	-5.557	0.000***	-0.062	-5.559	0.000***
cmdCode29	-0.163	-14.016	0.000***	-0.162	-14.015	0.000***	-0.163	-14.017	0.000***
cmdCode30	-0.274	-24.142	0.000***	-0.274	-24.145	0.000***	-0.274	-24.144	0.000***
cmdCode31	-0.088	-6.877	0.000***	-0.088	-6.878	0.000***	-0.088	-6.880	0.000***
cmdCode39	-0.637	-43.131	0.000***	-0.637	-43.131	0.000***	-0.637	-43.134	0.000***
cmdCode40	-0.304	-24.419	0.000***	-0.304	-24.419	0.000***	-0.304	-24.421	0.000***
cmdCode44	-0.560	-36.137	0.000***	-0.560	-36.137	0.000***	-0.560	-36.139	0.000***
cmdCode48	-0.539	-38.012	0.000***	-0.539	-38.012	0.000***	-0.539	-38.015	0.000***
cmdCode49	-0.078	-6.639	0.000***	-0.078	-6.639	0.000***	-0.078	-6.640	0.000***
cmdCode68	-0.281	-21.305	0.000***	-0.281	-21.306	0.000***	-0.281	-21.309	0.000***
cmdCode70	-0.373	-28.185	0.000***	-0.373	-28.186	0.000***	-0.374	-28.190	0.000***
cmdCode72	-0.327	-25.864	0.000***	-0.327	-25.864	0.000***	-0.327	-25.868	0.000***
cmdCode74	-0.196	-15.688	0.000***	-0.196	-15.688	0.000***	-0.196	-15.688	0.000***
cmdCode76	-0.448	-29.641	0.000***	-0.448	-29.641	0.000***	-0.448	-29.643	0.000***
cmdCode84	-0.486	-36.785	0.000***	-0.486	-36.786	0.000***	-0.486	-36.789	0.000***
cmdCode85	-0.373	-29.967	0.000***	-0.373	-29.967	0.000***	-0.373	-29.972	0.000***
cmdCode87	-0.316	-24.750	0.000***	-0.316	-24.751	0.000***	-0.316	-24.751	0.000***
cmdCode88	0.247	22.699	0.000***	0.247	22.699	0.000***	0.247	22.696	0.000***
cmdCode89	0.198	16.719	0.000***	0.198	16.718	0.000***	0.198	16.713	0.000***
exporterBEL	0.093	5.783	0.000***	0.093	5.786	0.000***	0.093	5.785	0.000***
exporterBGR	0.107	2.670	0.008**	0.108	2.722	0.006**	0.109	2.723	0.006**
exporterCYP	0.650	31.891	0.000***	0.651	32.023	0.000***	0.651	31.954	0.000***
exporterCZE	-0.107	-3.932	0.000***	-0.106	-3.926	0.000***	-0.106	-3.905	0.000***
exporterDEU	-0.367	-16.901	0.000***	-0.367	-16.901	0.000***	-0.367	-16.899	0.000***
exporterDNK	0.293	18.722	0.000***	0.293	18.723	0.000***	0.293	18.713	0.000***
exporterESP	-0.200	-9.283	0.000***	-0.200	-9.292	0.000***	-0.199	-9.263	0.000***
exporterEST	0.297	12.038	0.000***	0.298	12.123	0.000***	0.298	12.097	0.000***
exporterFIN	0.083	5.225	0.000***	0.083	5.226	0.000***	0.083	5.225	0.000***
exporterFRA	-0.295	-14.469	0.000***	-0.294	-14.469	0.000***	-0.294	-14.460	0.000***
exporterGRC	0.113	4.396	0.000***	0.113	4.444	0.000***	0.114	4.441	0.000***
exporterHRV	0.065	1.958	0.050.	0.066	1.996	0.046*	0.066	2.000	0.046*
exporterHUN	-0.063	-1.862	0.063.	-0.062	-1.848	0.065.	-0.061	-1.825	0.068.
exporterIRL	0.455	28.545	0.000***	0.455	28.574	0.000***	0.455	28.538	0.000***
exporterITA	-0.396	-16.411	0.000***	-0.395	-16.417	0.000***	-0.395	-16.400	0.000***
exporterLTU	0.145	4.879	0.000***	0.146	4.935	0.000***	0.146	4.928	0.000***

exporterLUX	0.586	24.621	0.000***	0.585	24.740	0.000***	0.585	24.631	0.000***
exporterLVA	0.333	11.093	0.000***	0.333	11.195	0.000***	0.334	11.161	0.000***
exporterMLT	0.669	34.070	0.000***	0.670	34.216	0.000***	0.670	34.143	0.000***
exporterNLD	-0.080	-4.376	0.000***	-0.080	-4.377	0.000***	-0.080	-4.383	0.000***
exporterPOL	-0.341	-9.295	0.000***	-0.340	-9.324	0.000***	-0.340	-9.274	0.000***
exporterPRT	0.089	3.662	0.000***	0.090	3.704	0.000***	0.090	3.704	0.000***
exporterROU	0.035	0.935	0.350	0.036	0.971	0.332	0.037	0.981	0.326
exporterSVK	0.042	1.430	0.153	0.043	1.464	0.143	0.043	1.472	0.141
exporterSVN	0.120	5.031	0.000***	0.121	5.070	0.000***	0.121	5.072	0.000***
exporterSWE	0.092	5.838	0.000***	0.092	5.837	0.000***	0.092	5.834	0.000***

Source: own calculations. ***: p-value < 0.001; **: p-value < 0.01; *p-value < 0.05; .: p-value < 0.1

8.4 Country-specific connectivity effects

Formula to calculate the total trade cost savings (CON) for country i during the period 2015-2024:

$$CON_i = -\sum_{p=1}^{P}\sum_{j=1}^{J}\left(\left(\widehat{\beta_8}\cdot(2024-2015)+\widehat{\varepsilon_{ijp2024}}-\widehat{\varepsilon_{ijp2015}}\right)\cdot\frac{TRADE_{ijp2024}}{\sum_{p=1}^{P}\sum_{j=1}^{J}TRADE_{ijp2024}}\right)$$

$$-\sum_{p=1}^{P}\sum_{j=1}^{J}\left(\left(\widehat{\beta_8}\cdot(2024-2015)+\widehat{\varepsilon_{jip2024}}-\widehat{\varepsilon_{jip2015}}\right)\cdot\frac{TRADE_{jip2024}}{\sum_{p=1}^{P}\sum_{j=1}^{J}TRADE_{jip2024}}\right)$$

$TRADE_{ijp2024}$: Value of exports of product p of country i to country j in 2024

$TRADE_{jip2024}$: Value of imports of product p of country i from country j in 2024

Member State	Total trade cost savings 2015-2024 (bn EUR)	Trade cost savings 2015-2024 per capita (EUR)	Member State	Total trade cost savings 2015-2024 (bn EUR)	Trade cost savings 2015-2024 per capita (EUR)
AT	3.152	344.15	IE	2.647	494.53
BE	5.311	449.42	IT	4.359	73.91
BG	0.818	126.86	LT	0.661	229.11
CY	0.382	394.97	LU	0.847	1260.49
CZ	4.311	395.44	LV	0.850	453.26
DE	13.115	157.15	MT	0.151	268.23
DK	1.323	221.96	NL	8.088	450.76
EL	0.857	82.41	PL	4.165	113.72
ES	7.134	146.72	PT	1.970	185.17
ET	0.738	537.14	RO	1.724	90.41
FI	1.013	180.74	SE	2.621	248.41
FR	5.720	83.53	SI	0.849	399.87
HR	0.614	159.05	SK	2.072	381.92
HU	1.105	115.24			

Source: own calculations

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