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Development Perspectives of STRING—How to Form a Thriving, Sustainable and Resilient Megaregion

Robert Gold, Klaus Schrader

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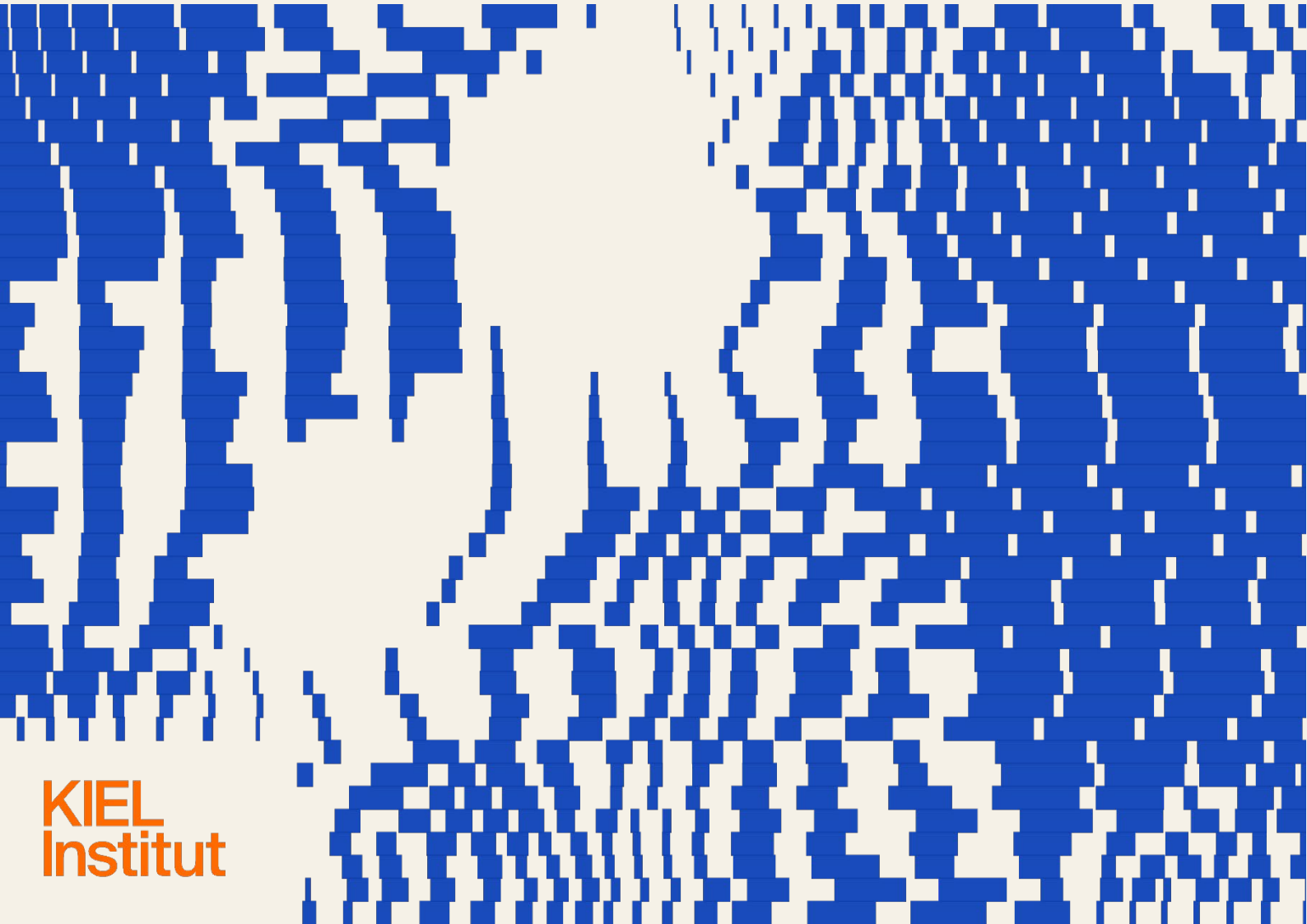

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Kiel Institute for the World Economy

Kiel location
Kiellinie 66, 24105 Kiel, Germany
Phone: +49 431 8814-1
info@kielinstitut.de

Berlin location
Chausseestraße 111, 10115 Berlin, Germany
Phone: +49 30 30830637-5
berlin@kielinstitut.de

Head of Editorial Team:
Dr. Klaus Schrader

Authorized Representative:
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Overview

- This study shows that overall, STRING seems on a viable growth trajectory. The development is driven by–but not limited to–the growth of the urban centers Oslo, Copenhagen, and Hamburg. All member regions have benefitted from the positive development, and performed better than the national averages, specifically in the recent years. STRING has not only grown economically, but also in terms of its population. Again, this is not limited to the urban centers. Specifically, the region has attracted high-skilled residents, an increasingly relevant resource for sustainable growth in ageing societies.
- Given these agglomeration dynamics, STRING may well be on the way to integrating into a mega-region in the sense of theory. However, national borders still provide significant obstacles to economic exchange within the STRING region. In international comparison, STRING is certainly less agglomerated than global megaregions like BosWash or the San Francisco Bay Area in North America. In European comparison, there are some similarities–and convergence–with polycentric megaregions like the Dutch Randstad or the German Rhine-Ruhr-Area. In any case, the STRING organization provides an institutional framework for mitigating administrative barriers to economic exchange by allowing for coordination between the local and regional decisionmakers.
- The construction of the Fehmarn Belt Fixed Link has a strong potential to fostering agglomeration dynamics within STRING by decreasing transportation costs between two of its most vibrant centers. To fully reap the benefits, it would be desirable to expand the axis Hamburg-Copenhagen to Oslo. What is more, it seems important to also improve the connections of the more peripheral regions to that axis.
- Investments into dual-use infrastructure may provide an opportunity for STRING to strengthen the connectivity within the region. The organization should use its leverage to initiate joint projects and support efforts to acquire external funding along that line.
- The Fehmarn Belt Fixed Link will likely shift the economic geography around the Baltic Sea more broadly. Against this backdrop, STRING may consider intensifying its cooperation with the neighboring regions, specifically those located in the "Green Jutland Corridor" on the Western flank of the Kattegat. Such cooperations might also help to address joint challenges from external security threats, and from climate change, thus strengthening the resilience of the Northern European region.
- The heterogenous membership structure of STRING may complicate its further integration, due to differing interests, competencies, and resources. The study suggests a two-sided approach: On the one hand, strengthening the mandate of the STRING Secretariat as an agency in policy areas of universal interest, specifically vis-à-vis national governments and the European Union. On the other hand, allowing for optionality in the members' involvement in cooperative projects.

- The study also asks for more actively reaching out to existing networks of businesses and the civil society to increase STRING's visibility—and to broaden its base.

Keywords: regional policy, economic integration, agglomeration economies, spatial planning, connectivity, global competitiveness, Schleswig-Holstein, Nordic Countries

Überblick

- Diese Studie zeigt, dass STRING insgesamt auf einem tragfähigen Wachstumskurs zu sein scheint. Die Entwicklung wird maßgeblich durch das Wachstum der städtischen Zentren Oslo, Kopenhagen und Hamburg vorangetrieben. Alle Mitgliedsregionen haben von der positiven Entwicklung profitiert und insbesondere in den letzten Jahren besser abgeschnitten als der jeweilige nationale Durchschnitt. STRING ist nicht nur wirtschaftlich gewachsen, sondern auch in Bezug auf seine Einwohnerzahl. Auch dies beschränkt sich nicht nur auf die städtischen Zentren. Insbesondere hat die Region hochqualifizierte Einwohner angezogen, die eine zunehmend relevante Ressource für nachhaltiges Wachstum in alternden Gesellschaften sind.
- Angesichts der beobachtbaren Agglomerationsdynamik könnte STRING auf dem Weg sein, sich entsprechend der Theorie zu einer Megaregion zu entwickeln. Allerdings stellen nationale Grenzen nach wie vor erhebliche Hindernisse für den wirtschaftlichen Austausch innerhalb der STRING-Region dar. Im internationalen Vergleich ist STRING sicherlich weniger agglomeriert als globale Megaregionen wie BosWash oder die San Francisco Bay Area in Nordamerika. Im europäischen Vergleich gibt es einige Ähnlichkeiten – und Konvergenzen – mit polyzentrischen Megaregionen wie Randstad in den Niederlanden oder dem deutschen Rhein-Ruhr-Gebiet. Jedenfalls bietet die STRING-Organisation einen institutionellen Rahmen für den Abbau administrativer Hindernisse für den wirtschaftlichen Austausch, indem sie die Koordination zwischen lokalen und regionalen Entscheidungsträgern ermöglicht.
- Der Bau der festen Querung über den Fehmarnbelt hat großes Potenzial, die Agglomerationsdynamik innerhalb von STRING zu fördern, indem er die Transportkosten zwischen zwei der dynamischsten urbanen Zentren senkt. Um die Vorteile voll auszuschöpfen, wäre es wünschenswert, die Achse Hamburg-Kopenhagen weiter nach Oslo auszubauen. Darüber hinaus erscheint es wichtig, auch die Anbindung der eher peripheren Regionen an diese Achse zu verbessern.
- Investitionen in sowohl zivil als auch militärisch nutzbare Infrastruktur könnten STRING die Möglichkeit bieten, die Konnektivität innerhalb der Region zu stärken. Die Organisation sollte ihren Einfluss nutzen, um gemeinsame Projekte zu initiieren und Bemühungen um externe Finanzierungen in diesem Sinne zu unterstützen.
- Die feste Verbindung über den Fehmarnbelt wird wahrscheinlich die Wirtschaftsgeografie rund um die Ostsee insgesamt verändern. Vor diesem Hintergrund könnte

STRING eine Intensivierung der Zusammenarbeit mit den Nachbarregionen in Betracht ziehen, insbesondere mit denen, die im „Grünen Jütland-Korridor“ an der Westflanke des Kattegats liegen. Eine solche Zusammenarbeit könnte auch dazu beitragen, gemeinsame Herausforderungen hinsichtlich äußerer Sicherheit und Klimawandel besser zu bewältigen und damit die Resilienz der nordeuropäischen Region zu stärken.

- Die heterogene Mitgliederstruktur von STRING könnte aufgrund unterschiedlicher Interessen, Kompetenzen und Ressourcen die weitere Integration erschweren. In der Studie wird ein zweigleisiger Ansatz vorgeschlagen: Einerseits soll das Mandat des STRING-Sekretariats als gemeinsame Vertretung in Politikbereichen von allgemeinem Interesse gestärkt werden, insbesondere gegenüber den nationalen Regierungen und der Europäischen Union. Andererseits soll den Mitgliedern die Möglichkeit gegeben werden, sich optional an Kooperationsprojekten zu beteiligen.
- Es wird eine aktivere Kontaktpflege mit bestehenden Netzwerken von Unternehmen und der Zivilgesellschaft befürwortet, um die Sichtbarkeit von STRING zu erhöhen und die Integrationsbasis zu verbreitern.

Schlüsselwörter: Regionalpolitik, wirtschaftliche Integration, Agglomerationseffekte, Raumplanung, Konnektivität, globale Wettbewerbsfähigkeit, Schleswig-Holstein, nordische Länder

1 Introduction[1]

This study takes stock of the development of the STRING megaregion, and discusses avenues for future progress. STRING stands for "South-western Baltic Sea Transregional Area–Implementing New Geography". It is an association of adjacent regions and municipalities located at the Baltic Sea–from Oslo over Gothenburg, Malmø, Copenhagen and Hamburg, up to Schleswig-Holstein and Southern Denmark. Initiated as EU-Interreg A project in 1999 to support the building of the Fehmarn Belt Fixed Link, STRING has developed into a membership organization with the goal to facilitate the development of a sustainable, cohesive and inclusive megaregion. Today, seven major cities from Norway, Sweden, Denmark and Germany are members of STRING, together with nine surrounding regions. The local administrations coordinate in a Steering Group, and common initiatives are decided by a Political Forum. A permanent Secretariat implements joint projects, in collaboration with a Contact Group of regional and municipal representatives.[2]

In 2025, the City of Kiel took over the rotating chairmanship of STRING. Together with the STRING Secretariat, it commissioned the Kiel Institut with this study. The aim is to assess–from an economic perspective–the progress made in forming a mega-region of European significance, and to derive actionable recommendations for the future development of STRING. Key questions are:

- Which factors classify STRING as a megaregion, which not (yet)?
- Which complementarities exist between the members, where lies potential for future cooperation?
- Which policies may support the development of STRING into a thriving, sustainable and resilient megaregion?

These questions are approached from two angles: Bottom-up, the development of STRING is compared to other global and European megaregions. This comparison is particularly insightful regarding the institutional structures that may govern the development of mega-regions. Top-down, the study assesses regional-level economic performance indicators derived from Eurostat and the European Commission's Directorate General for Regional and Urban Policy (ARDECO).

The results are interpreted in the light of the New Economic Geography, that stresses the relevance of agglomeration effects for regional development. Particular attention is given to the influence of the completion the Fehmarnbelt Fixed Link, and to external threats and challenges from climate change to a changing geopolitical environment. Against this backdrop, potential opportunities for cooperating with other regions, specifically those of the Green Jutland Corridor, are discussed.

[1] The authors would like to thank Kerstin Stark for preparing the manuscript and Korinna Werner-Schwarz for editing it.

[2] For details, see STRING (2025a).

Both theory and reality know different types of megaregions, with differing degrees of integration. Semantic questions aside, mega-region is about exploiting agglomeration economies. They result from a concentration of economic activity in densely populated centers, that spills over to the surrounding, more peripheral areas. The economic fabric of STRING provides such a poly-centric structure, and regional cooperation can help to reap the benefits.

The remainder of this report is organized as follows:

Section 2 introduces the theoretical concepts guiding the analyses and the interpretation of its results. It discusses different concepts of agglomeration economies and mega-regions, and applies them to the development of STRING.

Section 3 compares STRING to selected megaregions in Europe and abroad. A specific focus lies on differences in size and scope, and on the institutional structures governing the different megaregions.

Section 4 empirically assesses regional-level data on the development of STRING, in comparison to other megaregions and the neighboring regions of the Green Jutland Corridor. The analyses look into economic growth, demographic development, labor market developments, as well as business structure and dynamics.

Section 5 explores fields for future cooperation within STRING. It analyzes (dis-)similarities in the regional industry structures and discusses implications of the Fehmarn Belt Fixed Link and geopolitical threats.

Eventually, Section 6 concludes, also deriving some concrete policy recommendations.

2 STRING as a Megaregion

2.1 Characteristics of a Megaregion

Varying Concepts

There are different conceptions of what makes up a mega-region. Accordingly, the extent to which STRING can be considered a mega-region depends on which characteristics are considered to determine a mega-region. The idea of the mega-region can be traced back to Gottmann, who describes the growth of interdependencies between urban agglomerations by using as an example the region from Boston to Washington D.C., which forms a "megalopolis". In the literature, however, the term "mega-region" is not clearly defined, as Glocker (2019: 5–6), shows. In a simple concept, cities merge into a conjoined system as a result of population growth.

According to an overview of definitions of mega-regions by Harrison and Hoyler (2015: 7–11), a mega-region can comprise two or more urban systems that are linked to one another. The type of linkage was discussed in more detail as part of the "America 2050" project: Accordingly, a mega-region is a network of metropolitan regions pursuing common interests that are the starting point for political decisions (Regional Plan Association 2005: 12). The common interests result from the diverse interconnectedness of the individual regions. The relationships between the regions forming a mega-region are assigned to the following five categories:

- ecological systems and topography,
- infrastructure systems,
- economic linkages,
- settlement patterns and land use,
- a shared culture and history.

The more similarities there are in these categories, the stronger and more cohesive a mega-region is.

Against this background, Florida et al. (2008: 1–2) describes a mega-region as an integrated structure of cities and their surrounding areas in which labor and capital can migrate at low cost. They emphasize that a mega-region is not simply a larger city or metropolitan region, but a polycentric agglomeration of cities and their less dense surrounding areas (ibid.: 5–8). As in large cities, human capital, production capacities, innovation activities and receptive markets are concentrated in a mega-region, but on a broader scale. However, a larger population alone is not the distinctive feature, as it does not necessarily go in hand with greater economic power. A mega-region only attracts more capital and talent if the production capacities and yields are higher than elsewhere. In addition, urban mega-regions are autonomous players in global

competition with some independence from national systems, which can also favor their development potential.

However, Harrison and Hoyler (2015: 7–8) show that the development of a mega-region can also be seen as the merging of a large number of cities and their surrounding areas into a single urban system. In this case, the term "global city-region", "mega-city-region" or "metro(politan) region" is used, where a functional division of labor has developed between the individual parts.

In this context, the concept of a "polycentric mega-city region" is of particular relevance for Europe. According to Hall and Pain (2008: 3), this kind of mega-region consists of 10 to 50 cities and municipalities that are physically separated but functionally networked. They are clustered around one or more larger cities and derive their economic strength from a functional division of labor. Hall and Pain identify eight of these regions in Europe with a population of between 2 and 19 million. These are: South East England, Randstad, Central Belgium, Rhine-Ruhr, Rhine Main, Northern Switzerland (European Metropolitan Region), Paris Region, and Greater Dublin.

Benefits of a Mega-Region

The benefits of a mega-region are primarily based on economies of scale that cannot be realized independently by the individual members. Moreover, exchange of knowledge and ideas is facilitated by the connections between neighboring regions, which spurs innovative activities. According to Glocker (2018: 7–8), the advantages can be summarized as follows:

- Realization of economies of scale: through the shared use of transport infrastructure for people and goods, the development of stable housing markets and the development of business, science and technology parks.
- Positive correlation between productivity and agglomeration due to economies of scale, networks and a higher density of skilled workers.
- Imitation of agglomeration: A network of (smaller) cities can imitate an (urban) agglomeration and realize returns from it without bearing the costs of agglomeration (e.g. increasing market size through improved infrastructure while retaining the benefits of lean structures). This corresponds with the concept of borrowed size: By networking with neighbors, agglomeration advantages can be realized within a megaregion that exceed the effect of the actual population density (income advantages over non-networked cities, productivity gains through proximity to urban functions at a higher agglomeration level).
- Improved infrastructure: Improvement and renewal of the regional transport infrastructure for goods and people to deepen functional regional integration. At the same time, this allows pursuing sustainability goals (e.g. by shifting traffic to rail).
- Improved competitiveness: Smaller city networks increase their joint competitiveness by improving the accessibility of their economic centers, which not only

promotes cooperation but also increases international competitiveness and visibility, provided that the network benefits are distributed appropriately (e.g. through stops and feeder networks for high-speed trains).

Delineation of a Mega-Region

As such, "mega-region" describes the economic geography of a broader area, focusing on economic activity and its distribution in space. This is largely independent of administrative boundaries or governance structures. However, a mega-region with its own institutions or a certain level of organization can emerge when cities and regions face comparable challenges they cannot overcome alone—or at unjustifiable high costs when acting in isolation. Joining forces with compatible partners in the neighborhood may help to overcome such challenges together. In cooperation, regions may form "critical masses" and a bottom-up mega-region is created that can be formally identified as such. Still, it is difficult to determine the optimal scope, structure and density of a specific mega-region in advance. In the context of a bottom-up approach, there may be outside-regions that could increase the benefits of a mega-region when joining as members. The same applies to a "top-down" approach, in which a higher administrative level determines the regional composition of a mega-region.

Mega-regions can also be determined by specifying threshold values for selected indicators. For instance, a region would qualify as mega-region if contiguous urban settlement areas reach certain values for density, size or degree of urbanization. This morphological approach rather looks at a mega-region's external shape than relying on clear definitions or organizational structures. It is assumed that coherent development results from the functioning of an economic area as a mega-region. This involves the integration of several urban centers to a point where their labor markets and supply chains overlap. For the spaces in between, development is characterized by a lower density, but spillovers from the urban centers. These mega-regions can be identified statistically, for example, using data on population density or land use. Alternatively (or additionally), satellite-based night-light images can be used: The light intensity allows conclusions to be drawn about the population density, or the light sources can be used to draw conclusions about commercial areas and traffic routes.

Finally, a mega-region can be defined by the interactions of regional actors at different levels (functional or network approach). Identifying a mega-region requires information on the material and immaterial flows in this region. On the one hand, data at local level would be needed for material flows, for example, of commuters or goods. On the other hand, for visible immaterial flows in a mega-region, local data would have to be available, for example on communication (e-mails, telephone calls). Furthermore, local data on invisible immaterial flows would be needed, for example, on the exchange of knowledge. Thus, due to limited data availability, this approach often fails. Even if local data can be observed, it may distort the perception of a mega-region—e.g., if interaction only partially occurs via observed commuter flows because the distances are

too large or the transport infrastructure is patchy. Interactions could instead be based on unobserved cultural similarities or economic connections.[3]

In this study, STRING is considered from different angles. It is discussed as economic area, largely following a morphological approach. However, when assessing the development perspectives of STRING, the study will also take the institutional structures into account that guide this process, as well as network effects. This follows from the ambiguity of the definitions of "mega-region", and the variety of concepts and institutional arrangements that may guide its development. Analytically, there is no clear "yes" or "no" answer to whether STRING–or any other spatial area–is a mega-region. The aim of this study is to assess which characteristics of mega-region are fulfilled in STRING–and which not. This will guide the discussion of potential avenues for future integration.

2.2 Theoretical Background on the Economic Integration of Regions

Even if centrally planned top-down, mega-regions do not evolve from scratch, but from pre-existing regions integrating into a more unified economic framework. In market democracies, such integration processes occur naturally, resulting from the decisions of businesses and people located in the regions affected. The subsequent Section 4 will empirically assess STRING's state of (economic) integration. This analysis–and the interpretation of its results– is guided by theoretical considerations following the New Economic Geography.[4]

In the light of the New Economic Geography, regions are economic units that interact in production networks, e.g., along value chains, or through common labor markets. As economic actor, a region is characterized by more extensive economic exchange within that area, than with adjacent regions. Moreover, regions are defined by a center, where economic activity concentrates, and a periphery, that is strongly influenced by the development of the center. Figure 1 illustrates this view on regional economies.

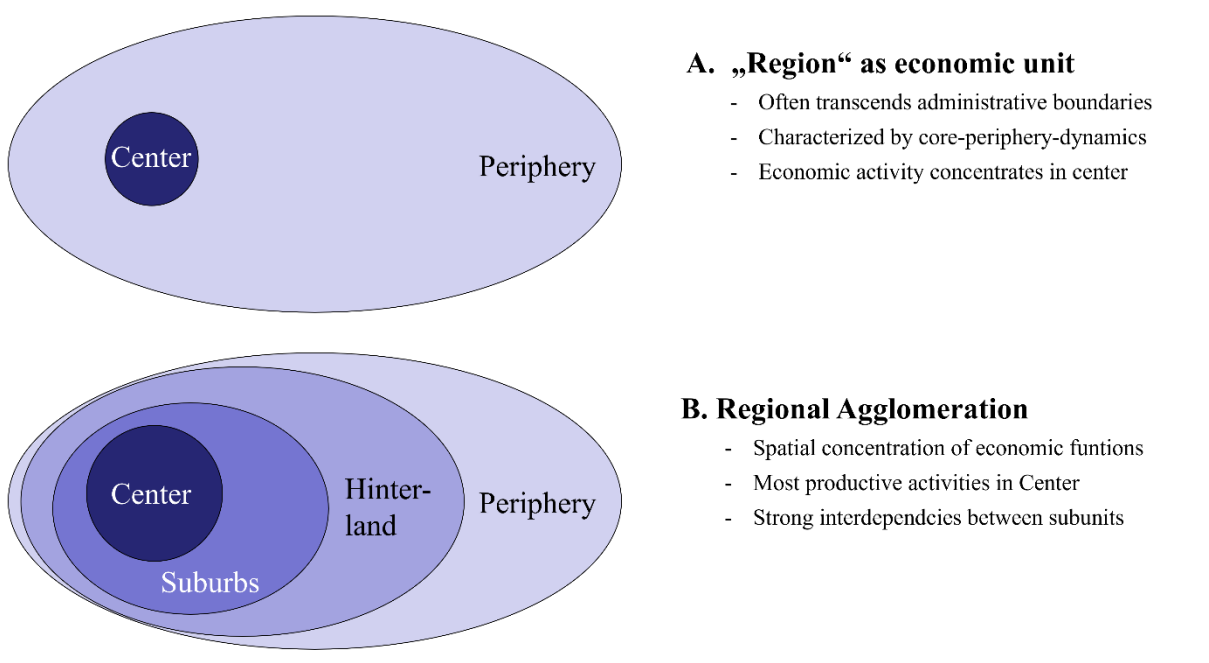
Basically, a region's growth perspectives depend on the economic success of the center. With an increasing concentration of economic activity, the center becomes more productive, and grows. As it reaches its spatial limits, this growth dynamics increasingly affect the surrounding periphery. Resource-intensive production moves to the Hinterland, and the different areas of the broader region specialize in providing specific goods and services, fulfilling different economic functions.[5] Some areas concentrate on providing housing for commuters working in the city. This spurs the provision of household-related services. Other areas may host larger production facilities serving

[3] See Glocker (2018: 11–14) on defining a mega-region.

[4] For an overview, see Fujita, Krugman and Venables (1999).

[5] On the transition from sectoral to functional specialization, see Duranton and Puga (2005).

Figure 1: Regions and Agglomerations as Economic Actors[a]



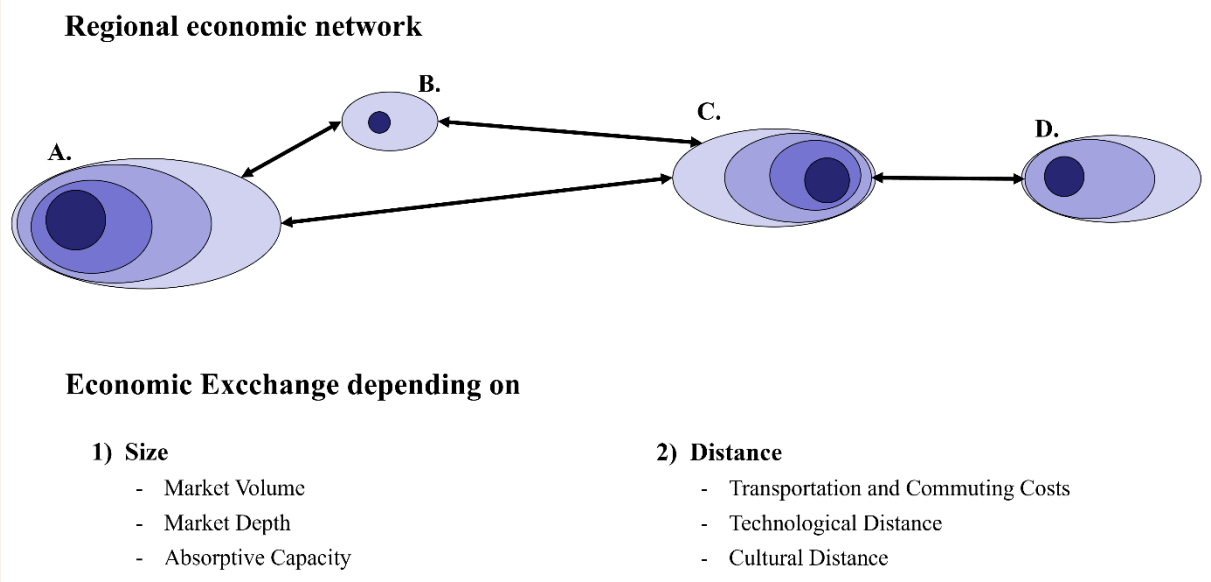
[a]The figure illustrates the theoretical view on “regions” as economic actors. This view guides the discussions throughout this study. Source: own illustration.

the center, that cannot afford the increasing land prices in the core. Conversely, the center concentrates on the most productive activities in the regional production network, often requiring high-skilled labor that moves to the city. Importantly, both the periphery and the center benefit from this development. The center can overcome its capacity constraints in space, when it cooperates with the periphery. The periphery can realize growth potentials that would not exist without the center. Overall, the region grows, even if the payoffs may be unevenly distributed.

Against this background, regions can be interpreted as economic actors that interact. Figure 2 visualizes this view on the economic exchange between regions.

Regions interact along value chains, e.g., trading intermediary goods and services within local production networks. Labor markets are another source of integration, if labor commutes between regions. A further example for regional links are innovation networks if, e.g., businesses in D. cooperate with research institutions in C. on joint R&D-projects (c.f. Figure 2). Many factors influence the strength of connections between regions, but two determinants stand out both theoretically and empirically: Size, and distance. Large markets like A. or C. always attract more economic activity and exchange than less-agglomerated regions like B. What is more, economic exchange decreases with distance. This is not restricted to spatial distance. More important are travel time and commuting costs between regions, i.e., transportation costs. Moreover, technological distance plays a role. If regional markets are specialized in the production of similar outputs, they will interact more extensively. However, cultural distance matters as well. Language barriers as well as differences in norms and preferences may hamper the exchange even between neighboring regions.

Figure 2: Economic Exchange Between Regions[a]



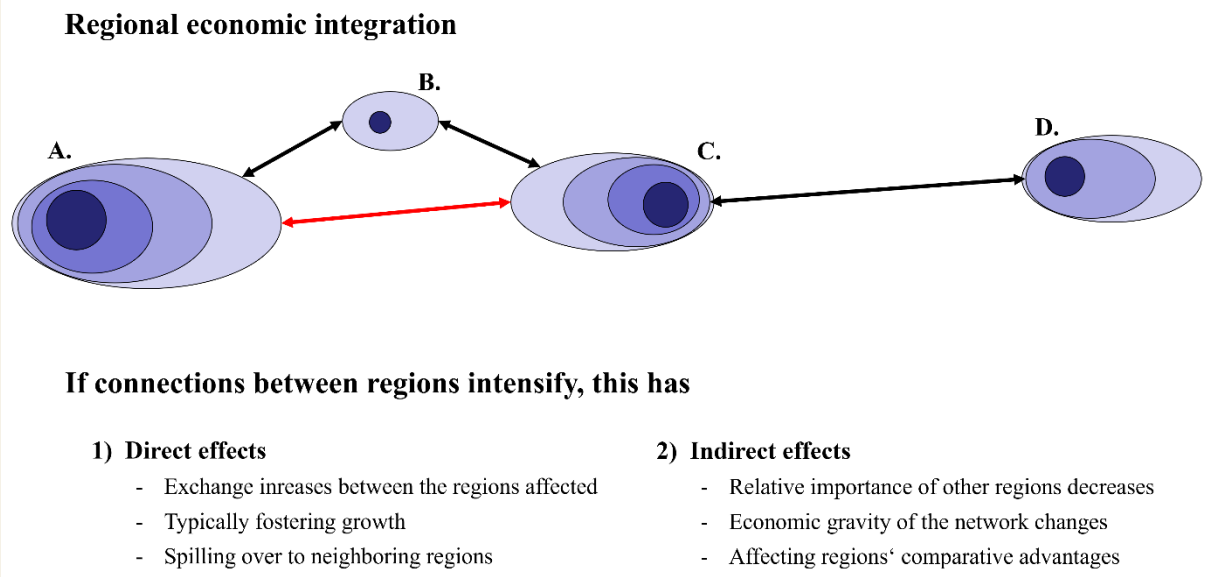
[a]The figure illustrates regional interactions in an economic network. Source: own illustration.

STRING can be interpreted as an economic network, as depicted in Figure 2. It contains agglomerations like Copenhagen, Hamburg or Oslo, larger cities like Gothenburg or Kiel, as well as less-agglomerated areas. The empirical results in Section 4 show agglomeration dynamics, with growing centers that attract people and firms, i.e., labor and capital. This development spills over to the regions connected to the centers. There are indications of regional economic integration, to the degree that for many indicators, the members of STRING develop similarly. However, the results also hint at remaining barriers. Particularly, the national borders still have an impact, specifically between Denmark and Germany, and between Sweden and Norway. Looking at STRING from an institutional perspective, the organization of STRING may help to mitigate the barriers to economic exchange between its members, specifically across international borders.

An economic network may turn into a mega-region if network ties intensify, leading to a further integration of the regional economies and markets. From an outside perspective, e.g., for investors or potential labor migrants, regions A., B., C., D. from Figure 2 would then be rather interpreted as one single economic area, than as four distinct markets. In the light of theory and with Figure 2 in mind, fostering integration implies reducing the economic distance between network partners. For instance, investments into traffic infrastructure may reduce transport costs and commuting times, tying regional markets closer together. Businesses strengthening their buyer-supplier relationships across regional borders may have similar effects, as well as intensified cooperation in research and development projects. Figure 3 illustrates how strengthening connections between some regions affects the economic network.

Economic integration implies strengthening the ties between regions, intensifying economic exchange and–if successful–fostering growth. Imagine regions A. and C. from

Figure 3: Economic Integration[a]



[a]The figure illustrates how the economic network depicted in Figure 3 reacts to strengthening ties between some regions. Source: own illustration.

Figure 3 strengthen their connection, e.g., by building new roads. As a direct consequence, economic exchange between A. and C. should increase. One could also say that A. and C. move more closely together, combining their economic forces. Thus, agglomeration dynamics intensify, fostering growth in A. and C. As a second order effect, B. gets more closely integrated into the network, benefitting from the growth of its most closely connected markets. Another second order effect affects D. In relative terms, its connection to C. loses importance. In absolute terms, this must not be a disadvantage. If C. grows due to integration, D. might get a smaller share of the cake–but the piece may still be bigger. However, D. might be tempted to also strengthening its connections to C., and thus to the network. One way would be to improve connectivity to C., e.g., by also investing into traffic infrastructure. Another way would be to strengthen business relations along value chains. For instance, D. might specialize in producing goods and services that are relevant inputs for production in C., A., and B. Mega-region does not necessarily imply that the regional markets A.,B.,C.,D. fully integrate, merging into one single market. However, all definitions from Section 2.1 above imply that network ties within a mega-region are so strong that economic development of regions A.,B.,C.,D. affects each other.

Figure 3 suggests that furthering the economic integration of a regional network strongly depends on the development of traffic infrastructure, and on strengthening links along business sectors that provide complementarities. Section 5 will look closer into such complementarities. The role of the Fehmarn Belt Fixed Link for the future development of STRING will be intensively discussed in Section 5.3. At this point, it is important to note that agglomeration dynamics evolve naturally, based on the economic decisions of businesses and people to interact more closely. Politics can remove obstacles to economic integration, and ensure that the institutional environment allows for closer cooperation and for economic growth. Even if this does not lead into a fully

integrated "Mega-region" in the sense of theory, it should still improve the growth prospects of the broader economic area.

2.3 The Perception of STRING as a Megaregion

From Lobby Organization to Potential Mega-Region

When STRING was founded in 1999 as an EU Interreg A project to promote the construction of a fixed link across the Fehmarn Belt, the STRING region was created in a top-down manner. The aim was to close a gap in the European transport corridor "Scandinavian-Mediterranean Corridor" (ScanMed), which stretches from Northern Europe (Narvik) to the Mediterranean region (Sicily/Malta). In this respect, the restriction of STRING to five member regions along the Fehmarn Belt route (Hamburg, Schleswig-Holstein, Region Zealand, Capital Region of Denmark, Region Skåne) seemed reasonable.[6] From the perspective of economic geography, the interests in this project were clearly distributed: Danish and Swedish exporters were to use the fixed link to reach their central sales markets in Western and Central Europe as well as the hub ports on the North Sea at a lower cost. Conversely, for Schleswig-Holstein and Germany as a whole, the Scandinavian market potential is relatively small in comparison to its main sales markets in the southwest and overseas. Thus, the interest in the fixed link as a trade route and the willingness to finance it was not so pronounced among these players.[7]

The agreement between Germany and Denmark on the construction of the fixed link across the Fehmarn Belt in 2008 fundamentally changed the character of STRING: STRING developed from a lobby organization for an infrastructure project into an institutionalized cooperation of regions and cities with the aim of joint regional development. It was realized that due to the challenges of global competition, the STRING members would have to jointly form "critical masses" in a "bottom-up approach" to develop greater competitiveness and thus higher growth dynamics. In the STRING perspective, the advantages of an interconnected megaregion are evident in three main areas: (1) Deploying sustainable transport infrastructure across borders; (2) positioning STRING as a globally acknowledged green hub; and (3) building a cohesive and inclusive megaregion which includes the efficient provision of infrastructure and services, enabling economic development and creating inclusive and resilient regions, protecting natural resources across multiple administrative boundaries, and moving goods.[8] The change in organizational purpose came with a broadening of the membership structure. Additional members were included with the perspective to increase "critical masses". At the end of STRING's development, there may be a polycentric, functional megaregion in which the individual members should benefit from the economies of scale of a polycentric agglomeration–provided that a balance of interests can be achieved

[6] See EU Commission (2025) and STRING (2025a).

[7] Cf. Schrader, Laaser and Sichelschmidt (2006: 34–36).

[8] Cf. STRING (2025b).

within the new mega-region. In this process, several steps of economic integration may be achieved in between, in line with the different concepts of “mega-region” discussed in Section 2.1.

Still, developing into a fully-integrated mega-region could turn out to be complicated because, unlike most mega-regions, the STRING region is a cross-border cooperation of cities and regions from several countries. This potentially results in limits to cooperation or difficulties due to different regulatory frameworks at national levels. However, the fact that the STRING countries, with Norway as the only exception, belong to the European legal area facilitates cooperation across borders. As Norway is part of the European Economic Area (EEA), it is integrated into the EU single market and can also participate in EU programs for interregional cooperation (Interreg C). Thus, there should be no prohibitive barriers to intensifying the cooperation within STRING. The question is about the joint interests of the members, and which degree of integration may be necessary to achieve their common goals.

The Further Development of STRING as a Megaregion

The STRING region has grown “bottom-up” following the expansions in recent years, most recently with the city of Kiel joining as a full member. This leads to the question whether the STRING region already includes all relevant members to exploit the full potential for developing "critical masses".[9] Of specific interest is the question whether from an economic perspective, it would be reasonable to further grow the network and include additional members. Section 3.4 more closely looks into size and scope of the STRING megaregion. Specific attention will be given to opportunities to more closely cooperate with the neighboring regions of the “Jutland Corridor”.[10]

Furthermore, the question must be asked in which fields the “critical masses” should be realized to develop STRING into a leading European mega-region. With reference to the OECD (2021), STRING (2025b) itself sees its future as a global powerhouse for the green transition. From STRING’s perspective, the advantages of an internally and externally interlinked mega-region should be used for this purpose. Indeed, combating climate change can only benefit from regional cooperation, specifically if this also generates business opportunities. This holds even more for a region built around joint traffic infrastructure. STRING is committed to developing into a sustainable megaregion, which is more ambitious than just fostering green growth. It also includes social sustainability, where balancing growth dynamics in urban agglomerations with structural change in peripheral regions may become more challenging in ageing societies.

[9] The enlargements included the following regions and cities: City of Copenhagen (DK) (2013), Region of Halland (S) (2018), Region of Västra Götalands (S) (2018), City of Malmö (S) (2018), Viken County (previous Akershus and Østfold County) (N) (2018), City of Oslo (N) (2019), City of Gothenburg (S), (2019), Region of Southern Denmark (DK) (2020), City of Helsingborg (S) (2022) and City of Kiel (D) (2023).

[10] At regional level, this involves Agder, Vestfold and Telemark in Norway as well as Midtjylland and Nordjylland in Denmark (see Region Nordjylland 2025). A “Jutland corridor” extended to the south includes Syddanmark, parts of Schleswig-Holstein (Schleswig; Kiel, Eckernförde, Rendsburg, Neumünster) and Hamburg (cf. EU Commission (2008) and Knieling, J., and A. Obersteg (n.d.))—however, the latter regions are already STRING members.

Eventually, sustainability also implies resilience to external shocks: ecological, economical, or geo-political.

Against this backdrop, STRING's strategy as megaregion is centered on the following objectives:

First, it includes the development of a cross-border, sustainable transportation infrastructure. Ideally, this should involve improving the region's external connections as well as linking STRING's sub-regions to form a polycentric structure.[11] The fixed link across the Fehmarn Belt, which will bring the Scandinavian STRING members closer to the economic centers of Europe and the international transport hubs, will make a concrete contribution to improved external networking. In the view of the OECD (2021: 22–24), the realization of the fixed link across the Fehmarn Belt should also be an impetus to improve internal networking by eliminating various transport bottlenecks (Oslo-Gothenburg high-speed rail line, additional fixed crossings across the Öresund, investments in the Fehmarn Belt–Hamburg rail link). According to the OECD, the expansion of the hydrogen corridor for emission-free truck traffic on the basis of a uniform STRING strategy would be a further networking component. Beyond this project level, however, the OECD also sees institutionalized, cross-border transport planning and the development of dedicated financing facilities for cross-border infrastructure as the hallmarks of a STRING megaregion.

As a consequence of joint infrastructure development in the STRING region, it could become reasonable to transfer (some) planning, decision-making and budget competencies to the mega-region level. On the one hand, this would require a willingness on the part of the individual STRING members to relinquish competencies. Thus, the projects or the mix of these projects should reflect the interests of all members. On the other hand, it would become necessary to transfer sovereign rights from the national level, which poses a particular challenge due to STRING's multi-country structure.

Second, the positioning of STRING as a globally recognized center for green growth is one of its main objectives. As part of a joint task, the existing green expertise and industry should become more visible internationally in order to attract skilled workers and capital. The OECD (2021: 24–25) also sees a concrete need for action here in terms of institution-building at megaregion level, as shown by the proposal for a joint investment agency for green projects. A proposed 4-country initiative to establish STRING as a "green hub" and create a common "green market" with harmonized framework conditions goes even further. In contrast, the idea of organizing and promoting networks of companies and research institutes is institutionally less ambitious. Other proposals relate to dialogue formats with all stakeholders in the mega-region, which also aim to harmonize national standards, e.g. in public procurement to promote green technologies, as well as incentives for the green industry and labor market initiatives to promote green employment.

[11] The OECD's study result (2024: 9–11) that internal accessibility within the six functional urban areas (FUA) located in the STRING region is at the highest level therefore falls short of the mark. Rather, the accessibility between the FUAs and the external accessibility of STRING as a whole is relevant at the level of the mega-region.

In this way, STRING has chosen an approach for the development of a megaregion that goes beyond just providing a common regulatory framework for regional market exchange. The focus on green growth reinforces the question about the "optimal" size and scope of STRING. To form "critical masses" in internationally competitive green sectors, external partners may be needed, which could make it more difficult to balance the interests of all current and potential STRING members. In addition, the question about STRING's comparative advantage in furthering the green transition emerges. In harvesting the market potential from green technologies, STRING competes with projects at the national level, as well as with other regions in Europe and abroad. It might be helpful to sharpen the focus of the green-hub approach, concentrating on the specific capabilities and needs of the current members–and potential future partners.

Third, STRING's objectives are about building a cohesive and integrative mega-region. Increasing interdependencies would result in growing problem-solving competence at mega-region level. In this context, the development of a STRING identity among the members is essential. The OECD (2021: 26–27) thus recommends identification-creating measures: The development of STRING as a brand to increase international visibility and as an umbrella for members' investment and tourism initiatives; participation of the population in STRING activities (e.g. culture and education); measures to make the benefits of STRING visible to all stakeholders in the megaregion; joint monitoring of STRING initiatives as a steering instrument and success control; visibility of STRING at EU level in harmonization and standardization issues; strengthening the STRING region through strategic expansions; deepening STRING through the formation of a "European Grouping for Territorial Co-operation" (EGTC, c.f. Box 1 in Appendix D.1); introduction of green financing instruments also at local level. For reasons of efficiency, responsibility for broad areas of regional development would therefore have to be transferred to STRING in line with the principle of subsidiarity.

Altogether, STRING has given itself an ambitious agenda to integrate into a green megaregion, stretching across four countries in Northern Europe. This implies that the deepening of STRING does not only depend on economic success, but also on a broad identification with STRING and its goals. To achieve this, the benefits of forming a megaregion must be evident to all relevant stakeholders to create a sense of common interest and thus community, resulting in a willingness to transfer competencies. However, the more focused the STRING objectives are and the more heterogeneous the membership is, the more difficult it is to develop a common STRING identity.

Against this background, it must be empirically clarified to what extent STRING can already be regarded as a mega-region and in which fields additional "critical masses" could be further developed. From an economic perspective, this involves identifying common characteristics of STRING members and complementarities with neighboring regions. Section 5 will address this issue. However, an initial approximation of STRING's qualities as a mega-region is already possible by comparing it with global and European megaregions on the basis of selected indicators. This will be done in the subsequent Section 3.

3 STRING in International Comparison

3.1 STRING and Global Megaregions

BosWash Megalopolis

The delineation of global megaregions is arbitrary if they have no institutional structures and therefore no defined boundaries, but are observed as a conglomerate in which cities and their surrounding areas have grown together. This applies, for example, to the megaregion "BosWash," described by Gottmann (1961) as a "megalopolis" stretching from Northern Virginia to New Hampshire. "BosWash" developed on the basis of interactions between inhabitants and economic activities in a large number of districts that Gottmann considered metropolitan and which formed a chain along the northeastern coast of the United States. Applied to today's administrative boundaries, the extent of "BosWash" can only be projected. In contrast to STRING, institutional structures have never developed in this construct. With around 50 million inhabitants, "Bos Wash" has almost three times the population of the STRING region, but covers a comparable area (Table 1). This means that the population density of STRING is significantly lower than that of the "megalopolis" around Boston and DC.

Table 1: Dimensions of STRING and Global Mega-Regions[a]

	Population (m people)	Area (km^2)	Population Density (people/km^2)
Greater Bay Area (GBA) ("Pearl River Delta")[b]	87.0	55,800	1,543
BosWash[c]	50.0	104,267	480
Greater Tokyo[d]	36.9	13,581	2,717
San Francisco Bay Area[e]	7.6	17,900	425
STRING[f]	14.4	109,410	131

[a]Ranked by population. — [b]The extended "Pearl River Delta" includes the regions of Shenzhen, Dongguan, Zhongshan, Jiangmen, Huizhou, Zhuhai, Guangzhou and Foshan, Zhaoqing as well as Hong Kong and Macau; it is officially named as "Guangdong-Hong Kong-Macao Greater Bay Area" (GBA). — [c]Boston, New York, Baltimore, Philadelphia, and Washington (- Megalopolis delineated by U.S. Census Bureau). — [d]Greater Tokyo consists of the prefectures of Tokyo, Saitama, Chiba and Kanagawa; it is part of the National Capital Region with more surrounding prefectures. — [e]"Nine-County-Area": Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma counties. — [f]Members from four countries: Germany: Hamburg, Schleswig-Holstein, Kiel; Denmark: Hovedstaden, Byen København, Sjælland, Syddanmark; Sweden: Skåne län, Hallands län, Västra Götalands län; Norway: Oslo, Viken.

Source: Statistics of Japan (e-Stat) (2025); BBC (2025), U.S. Census Bureau (2021), Berkely (2022), GBA (2025), MTC and ABAG (2025), STRING (2025b), Eurostat (2025a, 2025b); own compilation and calculations.

Guangdong-Hong Kong-Macao Greater Bay Area

The extended "Pearl River Delta" or "Guangdong-Hong Kong-Macao Greater Bay Area" (GBA), now the world's largest megaregion with 87 million inhabitants, is not just a conglomerate of metropolitan areas like BosWash, but has become a blueprint for innovation-driven development, reform, and openness for the People's Republic of China. The GBA is about making the most out of agglomeration advantages, which goes in hand with deepening the megaregion and coordinated regional development. Essentially, the GBA is meant to be a showcase region for living, working, and

traveling. A framework agreement signed in 2017 between Guangdong, Hong Kong, and Macao, with the participation of the central government, sets the following priorities for cooperation in the GBA: Developing an international innovation and technology hub, promoting infrastructure networking, establishing a globally competitive industrial landscape, promoting ecological conservation, developing an attractive environment for living, working, and traveling, strengthening cooperation and joint participation in the Belt and Road Initiative. These plans are to be implemented jointly by the three regional governments involved and the central government. For this purpose, Hong Kong has set up an own authority (GBA 2025).

A comparison between the STRING region and the GBA shows that the GBA has a broader thematic focus and its institutionalization is more advanced. Due to its smaller area and significantly larger population, the GBA has a population density that is more than ten times higher. This makes it easier to form networks and grow together into a polycentric functional region than in a region with a large Hinterland between smaller urban centers. But it should be noted that regional autonomy in China is limited by the strong central government, which means that regional development cannot be shaped independently by local institutions and decisionmakers. On the positive side, this can reduce the costs of reaching consensus and shorten planning and implementation periods. On the negative side, the lack of specific regional expertise and incentives for regional stakeholders can have adverse effects if they result in misguided developments at high costs.

Greater Tokyo

A comparison between STRING and Greater Tokyo, another global megaregion, highlights the differences in some kex indicators even more clearly: the population density in Greater Tokyo is more than twenty times higher, which results from its relatively small area and comparatively large population of 37 million. However, Greater Tokyo does not have a polycentric structure–economic activity is concentrated in the Tokyo metropolis. The centralization trend in the National Capital Region, which includes prefectures beyond Greater Tokyo, has led to high congestion costs. The central development plan for the National Capital Region strives to mitigate such negative agglomeration externalities. The aim is to develop decentralized structures with economic centers in the areas surrounding Greater Tokyo.[12] However, unlike in the STRING region, in Greater Tokyo, a dominant center determines the path of development.

San Francisco Bay Area

The San Francisco Bay Area has a polycentric structure and is therefore more similar to the STRING region. To be sure, there are significant differences compared to the STRING region: the number of inhabitants and the area are smaller than in STRING, while the population density is more than three times higher. Nevertheless, the similarities outweigh the differences: unlike Greater Tokyo, which has a dominant center, the

[12] See Jain and Arai (2017) and Tokyo Metropolitan Government (2024: 6).

Bay Area is a polycentric megaregion consisting of nine counties, which also include larger cities (San Francisco, Oakland, and San Jose). The Bay Area's economy and infrastructure are closely intertwined, but unlike the BosWash megaregion, there are institutions that give the Bay Area an organizational structure. By these institutional structures the Bay Area has a degree of organization that clearly exceeds the structures of the STRING region, without a central player pulling the strings as in the GBA. There is a number of joint institutions that perform important administrative and planning tasks for the local authorities in the Bay Area, as well as interest groups that represent their members vis-à-vis the public institutions in the megaregion. In this context, the ABAG (Association of Bay Area Governments), the MTC (Metropolitan Transportation Commission), and the Bay Area Council are particularly noteworthy.

The ABAG brings together all the county authorities in the Bay Area, although membership is voluntary. The ABAG offers a wide range of services that member cities, towns and counties can use for regional planning, regional coordination, or projects in the areas of housing, the environment, and transportation. These include land use and housing construction, environmental and water protection, energy efficiency, and disaster control. The ABAG promotes cooperation between the various stakeholders in the Bay Area and arranges financing for regional projects. With the support of the ABAG, local administrations engage in promoting growth and structural change, taking into account sustainability, resilience, and equity issues (ABAG 2025).

The MTC is the authority responsible for transportation planning, financing, and coordination in the Bay Area. In this role, it oversees all regional infrastructure networks in the fields of road, rail, and air transportation. Over time, its remit has expanded to include regional planning and housing construction, and its activities are designed to promote resilience (disaster control) and sustainability (environmental compatibility) in the Bay Area. The MTC cooperates on its projects with ABAG and other institutions in the Bay Area (MTC 2025).

The Bay Area Council represents the interests of the region's 330 largest employers and works with regional decision-makers to promote innovation, global competitiveness, integration, and sustainability. Through research and analysis, the Council helps identifying challenges and opportunities and contributes to strategic policy decisions. The topics are similar to those of ABAG and MTC and go beyond purely economic concerns (Bay Area Council 2025).

3.2 STRING as a European Megaregion

European Megaregions in Comparison

In Europe, megaregions with a dominant center are less suitable benchmarks for the development of the STRING region with its polycentric structure. This applies, for example, to metropolitan regions around Paris, Dublin, or London, where a center similar

to Greater Tokyo dominates–they all are monocentric structures, yet to different degrees.

Actually, the whole concept of European mega-regions has its roots in the notion of a "Blue Banana" as backbone of the European economy. The "Blue Banana," or originally "Dorsale européenne," is based on a description of the larger urban centers of Europe in the 1980s, which could be delineated according to economic power and population density. This prototype of a megaregion stretches from central England to London, "Randstad", Brussels, Rhine-Ruhr, Frankfurt-Rhine-Main, Switzerland, and Northern Italy including Milan, taking the shape of a banana. Initially, there was a notion that belonging to this corridor would determine whether a region would be a winner or loser of European integration. Prioritizing investment in this corridor, for example in infrastructure or location development, was considered most promising–with the result of regional polarization in Europe. In this respect, the image of the "blue banana" stands for segregation and can hardly serve as a role model for regional integration across European borders.[13]

However, the "Blue Banana" also includes "polycentric mega-city regions," which are discussed by Hall and Pain (2008), and could serve as European benchmarks for STRING. These include the "Rhine-Ruhr Metropolitan Region" and the metropolitan region "FrankfurtRhineMain" in Germany, as well as "Randstad", which includes the largest agglomerations in the Netherlands. In addition, the comparison includes the "Milan Metropolitan Area", a highly concentrated region in Northern Italy that extends far beyond the metropolis of Milan and encompasses a large number of neighboring regions and cities.

These European mega-regions are defined in different ways: "Rhine-Ruhr" and "FrankfurtRhineMain" have institutional structures and are therefore clearly demarcated. In this respect, they are similar to the STRING region, which can also be defined by its membership. The situation is different in the case of "Randstad", which is not an institutionalized cooperation or administrative unit, but was first observed from the air in 1938 as a ring of cities (Nadin and Zonneveld 2021: 10)–here, parallels can be drawn to the identification of megaregions using nightlight images. The "Milan Metropolitan Area" is also defined by observation by the OECD (2006: 26, 32), in this case on the basis of commuter flows.

In comparison, the STRING region covers by far the largest area (Table 2a.). STRING also has the largest population and the highest GDP ahead of "Rhine-Ruhr". However, also in this comparison, STRING has the lowest population density–"Rhine-Ruhr" and "Randstad" have a density six times higher. Due to its relatively low population density, the STRING region as a whole does not appear to be a typical polycentric agglomeration of cities with a less densely populated Hinterland. Compared to the other European

[13] In contrast to the "Blue Banana", the image of a European grape comprising a large number of European regions was developed, with a focus on reducing inequalities. Competition for investment and budgets should be replaced by (cross-border) cooperation between cities and regions, which should be promoted by the EU. For more on this discussion, see, for example, Kunzmann and Wegener (1991) and Faludi (2015).

megaregions considered here, the proportion of non-urban Hinterland is relatively high. Accordingly, in the large STRING region with its national borders and administrative barriers, the costs of overcoming distances between urban centers may play a greater role than in highly densely populated megaregions in other parts of Europe. Thus, investments in improved transport infrastructure and networks that lead to a reduction in distances should promise relatively high marginal returns.

A comparison of European megaregions also shows that the regions' importance for the national economies varies for each country (Table 2b.). For example, almost half of the Dutch population lives in the "Randstad", and this region accounts for more than half of the Dutch GDP. This makes the "Randstad" of central importance to the Netherlands; it is virtually the heart of the Dutch economy. "Rhine-Ruhr" as Germany's largest megaregion does not play this role, even though its share of population and GDP is 15 percent– "FrankfurtRhineMain" is even further behind. In Italy, the "Milan Metropolitan Area" has roughly the same relative weight with respect to population and area size as "Rhine-Ruhr" has in Germany, but almost one fifth of Italy's GDP is generated in this megaregion, which highlights its importance for the Italian economy.

Table 2: STRING and European Mega-Regions in Comparison 2022/2024

a. Dimension[a]

	Population (m people)	Area (km^2)	GDP[h] (m EUR)	Population Density (people/km^2)
Rhine-Ruhr Metropolitan Region[b]	12.6	15,163	577,406	830
Randstad[c]	8.7	10,512	527,879	825
Milan Metropolitan Area[d]	8.2	13,111	384,994	131
FrankfurtRheinMain[e]	5.8	14,754	329,572	394
STRING[f]	14.4	109,410	888,757	131

b. National weights[g]

	Share of national population (p.c.)	Share of national area (p.c.)	Share of national GDP (p.c.)
Rhine-Ruhr Metropolitan Region	15.1	4.2	14.6
Randstad	48.3	28.1	53.1
Milan Metropolitan Area	13.9	4.3	19.3
FrankfurtRheinMain	7.0	4.1	8.3
STRING[f]			
Denmark	67.1	51.3	71.9
Norway	36.5	6.5	31.2
Sweden	33.5	10.2	30.7
Germany	5.8	4.6	6.8

[a]Ranked by population size. — [b]21 independent cities and 13 districts in the German federal state of North Rhine-Westphalia. — [c]Dutch provinces of Noord-Holland (with Amsterdam), Zuid-Holland (with Rotterdam and the Hague), Utrecht and Flevoland (with Almere). — [d]Lombard provinces of Milan, Bergamo, Como, Lecco, Lodi, Monza and Brianza, Pavia, Varese and the Piedmontese Province of Novara; provinces that belong to Great Milan in a broad sense are not included here: the Lombard Provinces of Cremona and Brescia, the Piemontese Province of Alessandria and the Emilian Province of Piacenza. — [e]7 independent cities and 18 districts in the German federal states of Hesse, Bavaria and Rhineland-Palatinate. — [f]See Table 1 for the composition of STRING. — [g]Rhine-Ruhr Metropolitan Region and FrankfurtRheinMain as part of Germany, Randstad as part of the Netherlands, Milano Metropolitan Area as part of Italy, STRING shares sorted by Norway, Sweden, Denmark and Germany. — [h]Values for 2022; STRING: for 2022, extrapolation of the values for the Norwegian regions based on the growth rates for Norway as a whole.

Source: OECD (2006:32), Region FrankfurtRheinMain (2025), IKM (2025), Nadin and Zonneveld (2021: 10), Eurostat (2025a, 2025b); own compilation and calculations.

Since the STRING region spans several countries, the weight of each STRING sub-region in its home country is relevant for assessing the importance of STRING at the national level: In Denmark, the STRING sub-region dominates the national economy–with more than two-thirds of the population, over half of the area, and a share of more than 70 percent of Danish GDP, STRING shapes the entire Danish economy. Such STRING dominance is not observed in the neighboring Scandinavian countries Norway and Sweden, but shares of more than one-third of the population and over 30 percent of GDP are still significant–despite a comparatively small share of the total area. In contrast, the STRING subregion in Germany does not play a significant role for the German economy–with a GDP share of less than 7 percent, the economic weight of STRING is much lower than in the Scandinavian neighbor countries. Thus, it might be concluded that at the national level, the relevance of STRING is weakest in Germany, while in Denmark, the further development of STRING is likely to be central to the entire country.

Economic Weights Within the STRING Region

However, the relative importance of the STRING sub-regions for the national economies does not allow to infer on the importance of the individual sub-regions for STRING itself–this depends on the distribution of weights within the STRING region. Here, it can be seen that the German sub-regions have the largest share of the population within STRING and, with a 30 percent share of GDP, are on a par with Denmark. The Swedish and Norwegian sub-regions are lagging with a GDP share of around 20 percent each. The German sub-regions thus contribute significantly to the economic weight of the STRING region, which is highly relevant in terms of achieving critical masses.

Table 3: Distribution of Regional Weights in the STRING Region 2022/2024[a]

	Share of STRING population (p.c.)	Share of STRING area (p.c.)	Share of STRING GDP (p.c.)	Population Density (people/km^2)
Denmark: STRING sub-region	27.9	20.1	30.9	182
Hovedstaden	13.3	2.3	19.5	747
Byen København	*5.7*	*0.2*	*10.5*	*4,571*
Sjælland	5.9	6.6	4.0	118
Syddanmark	8.6	11.2	7.4	101
Norway: STRING sub-region	14.1	22.9	19.9	81
Oslo og Viken	14.1	22.9	19.9	81
Oslo	5.0	0.4	10.7	1,581
Sweden: STRING sub-region	24.6	41.8	19.1	77
Skåne län *(with Malmö, Helsingborg, Lund)*	9.9	10.3	7.2	126
Hallands län	2.4	5.2	1.6	60
Västra Götalands län *(with Gothenburg)*	12.3	26.3	10.4	61
Germany: STRING sub-region	33.4	15.1	30.1	290
Hamburg	12.9	0.7	17.0	2,452
Schleswig-Holstein	20.6	14.4	13.1	187
Kiel	*1.8*	*0.1*	*1.5*	*2,116*

[a]Shares of STRING total in per cent; Population data for 2024, area data for 2023/24, GDP data for 2022 (estimates for the Norwegian regions, see Table 2).

Source: Eurostat (2025a, 2025b); own compilation and calculations.

Across national borders, the three large, densely populated urban centers contribute significantly to the importance of the STRING region: Copenhagen, Oslo, and Hamburg alone account for almost 24 percent of the population and 38 percent of GDP. When the Danish capital region is considered as a whole, almost half of STRING's GDP is generated in this densely populated area. Although the Swedish part of the STRING region does not include comparable metropolitan areas, the cities of Malmö, Helsingborg and Lund in Skåne and Västra Götalands län, as well as Gothenburg, which is by far the largest center, are crucial to the economic strength of these regions. In Schleswig-Holstein, Kiel is the largest urban center, ranking between Malmö and Gothenburg in terms of population. However, Kiel is less dominant in Schleswig-Holstein–the population and economic power are more widely dispersed here.

3.3 Institutional Structures of European Megaregions

Like the global megaregions, the European megaregions along the "blue banana" have different institutional structures. Polycentric mega-regions in which institutionalization has already taken place in various forms and to varying degrees are of particular interest as benchmarks for the development of STRING. The "Randstad" in the Netherlands and "RheinRuhr" and "FrankfurtRheinMain" in Germany are therefore considered below.

Randstad

"Randstad" was observed as a ring-shaped conurbation and described as a "ring city"– "Randstad" is thus similar to polycentric agglomerations that can be identified, for example, by nightlight images. However, no independent institutional structure has developed, potentially due to the tripartite administrative structure in the Netherlands, which consists of national, regional, and municipal levels. The national level draws up strategic spatial planning, which is implemented by the municipalities and coordinated by the provinces. In addition, centralizing responsibilities in the "Randstad" region across four provinces, two large metropolitan regions, and a large number of municipalities is considered too complex, especially since there is no functional integration across the entire region. Instead, municipalities have been merged and cooperation between municipalities and provinces has been promoted (Lambregts et al. 2006: 144–145, Spaans et al. 2021: 276–277).

With respect to institutional structures in "Randstad", this means, first and foremost, that regional cooperation rests on associations between the various urban centers. Specifically, there are three platforms for regional cooperation:

1. The "Metropolitan Region Amsterdam" (MRA) comprises 30 municipalities, two provinces, and the Amsterdam Transport Authority. The MRA has its own committees that make decisions on cooperation and prepare and coordinate joint projects (platform of regional policymakers, steering group, thematic working groups, and secretariat). The main focus is on developing an internationally

competitive region with a shared mobility system that ensures a high level of internal and external connectivity, joint housing and labor markets, the establishment of a resilient, green, and inclusive MRA economy, and the creation of a consistently high quality of life in the MRA by promoting the growth of the MRA economy.[14]

2. The "Metropolitan Region Rotterdam The Hague" (MRDH) consists of 21 municipalities in one province and has objectives similar to the MRA, namely strengthening the economy of the entire region and promoting international competitiveness through regional cooperation. It also aims to furthering the development of a modern, sustainable transport infrastructure, including the expansion of public transport and the bicycle and road networks. Further objectives include improving the digital infrastructure, creating housing and commercial sites, promoting innovation and start-ups, cooperating on recreational areas and green living, and drafting a regional energy strategy.[15] The MRDH has joint bodies for planning and implementing joint projects: A General Board of municipal leaders who make decisions, set the budget, and organize supervision; a five-member Executive Board with an office for day-to-day business; and a joint transport authority.[16]
3. The Metropolitan Region of Utrecht (MRU) consists of two networks: U10, an association of 16 municipalities and the Region of Amersfoort, as well as the province of Utrecht. The common goals are very similar to those of the MRA and MRDH, such as mobility, economy, housing, urban development, health, and sustainability. In addition, there are spatial planning tasks that are carried out together with other network partners. These include the Utrecht Economic Board, an association of companies, educational institutions and authorities that aims to promote the competitiveness and prosperity of the region through the development of strategic plans and concrete initiatives.[17]

Although "Randstad" is characterized by fragmented administrative structures, the three metropolitan regions have an institutional framework for cooperation on intermunicipal challenges that cannot be tackled at the municipal level. However, the principle of subsidiarity does not only apply to the division of labor between metropolitan regions and municipalities. The "Regio Randstad" is a cooperation platform that encompasses all "Randstad" provinces. Its aim is to promote the international competitiveness and visibility of the region as a whole, particularly vis-à-vis the EU. In the past, the "Regio Randstad" has therefore represented Randstad's interests in Brussels in the shaping of EU policy and legislation, and in the use of EU funding. It also promotes the region in Europe and supports international cooperation. The "Regio Randstad" is one of four organizational units of the "House of the Dutch Provinces," the Brussels-based EU representation of the Dutch provinces, in which the four "Randstad" provinces are represented. This platform also facilitates coordination within the "Randstad" between

[14] See MRA (2025).
[15] See MRDH (2025).
[16] See Council of Europe (2022: 21).
[17] See MRU (2025) and EBU (2025).

metropolitan regions and provinces, for example, on region-wide transport infrastructure issues, and serves as a contact at the national level.[18]

The institutional development of the "Randstad" as a whole suggests that an observable polycentric agglomeration does not necessarily give rise to separate governance structures. In this case, the existing institutional structure in the Netherlands and the functional division of labor in the sub-regions argue against the institutionalization of a mega-region. This suggests more intensive cooperation and institution building at the level of metropolitan regions, provided the national framework allows. Due to very similar development goals and regional overlaps, for example in infrastructure, it is nevertheless in the interest of the sub-regions to have joint coordination and representation of interests. This allows coordination between the sub-regions to be organized effectively, and critical masses to be mobilized in the pursuit of common development goals. This partial regional integration under a common umbrella establishes a division of labor that follows the principle of subsidiarity.

Rhine-Ruhr

"Rhine-Ruhr" is a historically grown economic area comprising a dozen larger cities and a large number of smaller and medium-sized towns. There is no pronounced hierarchy between the centers and no dominant player. "Rhine-Ruhr" appears to be a polycentric structure forming a dense network via its transport infrastructure. Over time, a sectoral division of labor has developed between the cities, allowing synergies to be exploited. However, the region as a whole lacks an institutional framework for cooperation and the associated regional organization and planning. This can be explained by the fact that regional stakeholders from politics and business do not perceive "Rhine-Ruhr" as an integrated spatial unit. Administrative and political fragmentation and the lack of a regional identity and regional awareness may also explain why "Rhine-Ruhr" does not play a distinct role in corporate strategies.

Due to its population size and economic power, "Rhine-Ruhr" does have the "critical mass" that characterizes a European mega-region, and the Ruhr area in conjunction with the Rhineland enjoys a higher degree of international visibility and competitiveness than either sub-region alone. However, further institutionalizing "Rhine-Ruhr" could create a powerful player with the ability to set its own political priorities, potentially suppressing other interests–which is not necessarily in the interest of state politics and other regional policymakers (cf. Knapp et al. 2006). As a result, there is a lack of political will to further institutional integration into a megaregion, which limits the visibility of the "Rhine-Ruhr" metropolitan region. Its participation in the "Initiativkreis Europäische Metropolregionen in Deutschland" (IKM, Initiative Group of European Metropolitan Regions in Germany) is already an exception. This is a platform for exchanging information and representing common interests in the EU. However, "Rhine-

[18] See Lambregts et al. (2006: 144–145), HNP (2025) and LobbyFacts.eu (2019).

Ruhr" is not represented by an organization of its own, but by two regional associations (IKM 2025a).

Parallels with the Dutch "Randstad" are obvious. Specifically, there is no strong central player due to a lack of regional identity and the fragmentation of the region as a whole. Similar to "Randstad", "Rhine-Ruhr" consists of two sub-regions but with very different institutional structures. The "Regionalverband Ruhr" (RVR) comprises the independent cities and districts of the Ruhr area and is a public corporation with a full-time administrative structure that has existed in various forms since 1920. The RVR is responsible for key issues in the Ruhr area, including regional development and regional planning, on behalf of the state of North Rhine-Westphalia. It acts as a networker, coordinator, and project sponsor. Its project areas include mobility, leisure/tourism, housing, public services, green infrastructure, education, and science. Due to its relatively broad remit, the RVR has its own administration with a detailed division of responsibilities.[19]

In contrast to the RVR, the sub-region "Metropolitan Region Rhineland" (MR) is organized as an association with significantly fewer powers and has only existed since 2017. It is an interest group of Rhineland cities, districts, and chambers that acts more as a lobby organization. The MR cultivates the political landscape, strengthens regional awareness, and aims to identify synergies and critical masses that give the region as a whole an advantage in international competition. The MR's main focus areas are transport and infrastructure, energy transition, and development of a regional profile. Different topics are handled by separate working groups, whose output includes position papers, political statements, and analyses of location factors. The aim is to develop a Rhineland identity and represent the interests of the Rhineland both internally and externally. These tasks are handled by a small team of full-time staff, whose size reflects the association's structure and relatively limited powers.[20]

As in the case of "Randstad", "Rhine-Ruhr" shows that a polycentric agglomeration with high connectivity does not necessarily lead to the development of an institutional framework for the entire region. In "Rhine-Ruhr," like in "Randstad", regional interests are focused on the development of the respective sub-region; a regional identity is more likely to exist at this level, and a strong regional superstructure would probably be perceived as undesired competition. In addition, there are major differences between the sub-regions in terms of institutional framework conditions, which are particularly evident in their history, distribution of competences, and legal form. The organization of the RVR is much more in line with the principle of subsidiarity than is the case in the "Metropolregion Rheinland." Cooperation between the sub-regions in "RhineRuhr" is considered useful as far as it concerns international visibility and thus competition between European metropolitan regions. However, this only applies to coordination processes, not to a common umbrella organization.

[19] See IKM (2025a) and RVR (2025).

[20] See IKM (2025b) and Metropolregion Rheinland (2025).

FrankfurtRhineMain

The "FrankfurtRhineMain" metropolitan region also has a polycentric structure: in addition to Frankfurt, there are four other urban centers and a large number of smaller municipalities spread across three federal states. This administrative fragmentation has historical roots, as has the competition between the individual centers and the different regional identities. However, there is also a high degree of connectivity and sectoral division of labor in the FrankfurtRhineMain metropolitan region, with Frankfurt as the regional, European and global hub. Institutional structures were developed to overcome administrative fragmentation, and to increase the region's international competitiveness. To this end, a regional association called "FrankfurtRhineMain" was established in the state of Hesse with a full-time structure limited to a Hessian core of regions around Frankfurt–the area covered by the regional association is thus smaller than the metropolitan region. The regional association is responsible for sovereign tasks such as the regional land use plan and landscape plan, but it only performs these tasks for its members.[21] Formal decisions are made by an extended regional executive committee in which the members are represented. The institutional structure of the regional association thus shows parallels to the "Regionalverband Ruhr."

Moreover, the regional association is responsible for coordinating regional development and implementing overarching projects, involving the entire metropolitan region, i.e., including regions in Rhineland-Palatinate and Bavaria. To cope with these tasks, the association has an office that initiates and manages strategies and projects for the entire metropolitan region. The office acts as a coordinator and platform for all stakeholders throughout the metropolitan region. Committees and working groups are set up to manage and implement specific projects. The regional association represents the metropolitan region at state and national level, but also within the European framework. To fulfill this task, the regional association maintains a European office in Brussels, which is active on behalf of the entire FrankfurtRhineMain metropolitan region (Region FrankfurtRheinMain 2025, IKM 2025b).

Private initiatives also promote networks between companies in the FrankfurtRhineMain metropolitan region across state borders: The FrankfurtRhineMain Economic Initiative is an association of companies that acts as a lobby organization, project sponsor, and communication platform.[22] Another business initiative is the "IHK-Forum Rhein-Main", in which all chambers of commerce and industry in the metropolitan region are represented. The forum acts as an interest group for its member companies and provides economic data on the metropolitan region. The activities of these initiatives are likely to help forge an identity for the metropolitan region and contribute to joint location marketing.

[21] See Freytag et al. (2006), IKM (2025b) and Region FrankfurtRheinMain (2025).

[22] See Wirtschaftsinitiative FrankfurtRheinMain (2025) and IHK Hanau-Gelnhausen-Schlüchtern (2025). In addition, there are a number of other initiatives in the metropolitan region that are active in the areas of international marketing, location development, culture, and communications promotion (see IHK Wiesbaden 2025).

Even though the FrankfurtRhineMain metropolitan region lacks an identity of its own, and despite the competition within the sub-regions, the regional players have recognized the advantages of a common umbrella organization as institutional framework. As with "RheinRuhr," international visibility and greater competitiveness of a megaregion are the key motives for central coordination, in line with the principle of subsidiarity. Unlike "RheinRuhr," however, the "FrankfurtRhineMain" metropolitan region does not consist of two sub-regions with different degrees of integration, but rather a more deeply integrated regional core with a less integrated periphery. Private initiatives by the business community, which also raise the profile of the FrankfurtRhineMain metropolitan region, help to overcome fragmentation in the megaregion.

Altogether, as diverse as the definitions and assigned functions of mega-regions are (c.f. Section 2.1), as heterogenous are the organizational structures governing existing megaregions in Europe and beyond. At the core, all these organizations strive to exploit agglomeration economies, that result from urbanization processes with one or more economic centers growing to an extend where their economic developments affect each other–as well as their less-agglomerated neighbors (c.f. Section 2.2.). For sure, institutional structures may facilitate such processes by removing barriers to inter-regional cooperation. Beyond pure economics, regional integration may advance to a degree where initially independent regions grow into a unified socio-economic network. Whether organizational structures should foster a more extensive integration beyond economics is essentially a political decision. The institutional setup of STRING provides a basis for different degrees of interregional cooperation. Opportunities and challenges of such developments will be assessed in the subsequent Section 5.

3.4 Size and Scope of the STRING Megaregion

A lead question for this study is whether STRING can be considered a European Megaregion. If not, the question remains whether STRING could turn into one, and how this could be achieved. One central aspect is the economic, social and political integration within the region. However, discussing future prospects naturally touches upon the current membership structure. Does STRING yet have the critical mass to fully exploit agglomeration economies? In 2020, the OECD (2021: 20–21) endorsed an enlargement of STRING by further regions in Southern Norway, Southern Sweden, Jutland, and Holstein, because this would offer the opportunity to expand economic links in the STRING region and incorporate additional production capacities. Thus, the study at hand also considers whether an expansion of STRING might help to realize additional economies of scale. First, this is a question of market size. Second, it is a question of complementarities, i.e., whether growing the network might help to strengthen its comparative advantage vis-à-vis other European (mega-)regions. Eventually, whether an enlargement of STRING could be beneficial is also a question of political economy. Most likely, a larger area and population would give STRING more weight in relation to national governments or the European institutions. However, incorporating members with

deviating interest could also hamper a further integration of the STRING region. These issues will be discussed with a deliberate focus on STRING's direct neighbors.

Western Scandinavia

A meaningful enlargement of the STRING region to include additional sub-regions would have to increase economic weight, improve internal and external connectivity, lead to gains in expertise, or promote critical masses in areas of cooperation. Since STRING was founded as an EU Interreg–A project to promote the closure of a gap in the European transport corridor "Scandinavian-Mediterranean Corridor" (ScanMed), STRING membership was also of interest to other regions benefiting from closing this gap. It is therefore understandable that all Norwegian and Swedish regions of "Western Scandinavia" joined STRING between 2018 and 2020,[23] with Skåne, the southernmost region, already a STRING member since 1999. Like the founding regions of STRING, these regions are all located in ScanMed and are therefore interested in better access to the large markets in Western and Central Europe, and to the international overseas ports. As Western Scandinavia also includes the population centers of Southern Norway and Southern Sweden, STRING gained economic strength and expanded its polycentric structure.

Joining STRING eliminated the option of creating a separate megaregion "Western Scandinavia," which had earlier been discussed by the OECD (2018). However, no serious steps had been taken to create institutional structures for this bottom-up initiative, which was intended to promote cross-border cooperation–it did not even have an official name. The focus of the cooperation between the participating cities and regions was an EU project to improve cross-border rail infrastructure: This "8 Million City" project aimed to modernize and expand passenger and freight rail transport along the coast of Scandinavia from Oslo to Copenhagen.[24] The railway line was intended to reduce transport times, improve connectivity in the region, contribute to the creation of a common labor market, and reduce environmental pollution. A cross-border institution called the "Scandinavian Arena" was established to coordinate the project. After the project failed due to other priorities of the Swedish government, a clear vision of what could be achieved together was missing, so that, according to the OECD (2018: 18–19), a "cooperation fatigue" spread and the region as a whole no longer played a role in decisions at the national level in either country.

Nevertheless, from the OECD's perspective (2018: 11, 14–17), there were a number of arguments in favor of a "Western Scandinavia" megaregion: a relatively large population of 5 million; polycentric structures with a Hinterland; commuter traffic; cross-border corporate investments and vacation home purchases; a high quality of life throughout the region; a diversified, innovative, and resilient economic base; classification of all regions as "innovation leaders" with leading research and educational institutions;

[23] At the regional level, these were: Västra Götaland, Halland, and Oslo og Viken (Oslo, Akershus, and Østfold), plus the cities of Malmö, Helsingborg, and Gothenburg.

[24] For more details, see: The Scandinavian 8 Million City (2014).

cross-border clusters; a long tradition of Nordic cooperation; the existence of regional partnerships; and joint access to EU Interreg programs.

From these findings of the OECD, which explain why the development of "Western Scandinavia" into a functional megaregion stalled even though some conditions for forming a megaregion were in place, lessons can be learned for the STRING region. These include:

- The relevance of institutional structures to ensure the visibility and political relevance of a megaregion.
- Formulation of concrete cooperation content or priorities that ensure dynamism and focus in the cooperation between the partners.
- Identification of areas of cooperation that lie in the interest of all members, for instance: infrastructure development to improve internal and external connectivity, labor market cooperation to combat the shortage of skilled workers, exploitation of synergy effects in research and development and education, further development of existing clusters.
- Realization of a win-win situation for all participants through participation in the megaregion.
- Developing a common umbrella brand to identify with the megaregion.
- Harmonization of different administrative frameworks in a cross-border megaregion.
- Utilization of existing networks for cooperation in a megaregion.

However, it should be noted that the STRING region is even more heterogeneous than the "Western Scandinavia" sub-region–reaching consensus and balancing interests seems more difficult in comparison, due to the number of different stakeholders spread across four countries.

Jutland Corridor

The Green Jutland Corridor is STRING's Western neighbor. It was initiated as a project within the framework of Interreg "Öresund-Kattegat-Skagerrak," which is also part of ScanMed.[25] The membership structure does not overlap with STRING–it comprises regions connected by sea, road, and rail in Southern Norway (Agder, Vestfold, and Telemark), and Midtjylland and Nordjylland (Nordjylland Region 2025) on the Danish side. The cooperation aims to develop efficient and sustainable solutions for the transport of people and goods. Planning and investment in low-emission transport are to be coordinated across borders to create a green corridor (Grønn Jyllandskorridor n.d.). From the perspective of Jutland Corridor representatives, this transport corridor also strengthens the resilience and security of supply of the entire region in the event of disruptions and ensures military mobility (Vestfold Fylkeskommune 2024). In the future, the

[25] See Grønn Jyllandskorridor (n.d.) and Invest in Vestfold & Telemark (2023).

establishment of a permanent development platform involving stakeholders from public authorities, ports, transport service providers, and the shipping industry is being considered.

The close proximity to STRING makes the Green Jutland Corridor a natural candidate for exploring complementarities. From a geographic perspective, adding the Green Jutland Corridor to STRING encircles the Kattegat. From an economic perspective, the question is whether intensifying the links between STRING-regions and the regions belonging to the Green Jutland Corridor could strengthen agglomeration economies.

In terms of infrastructure development, there clearly seem to be synergies and potential for cooperation: The STRING ports of Oslo and Gothenburg are connected by sea via the "Jutland Corridor", which also serves the connectivity of the STRING region with its target markets further south. In addition, through its integration in ScanMed, the "Jutland Corridor" is part of the same transport networks as the STRING region. The environmental focus of the Green Jutland Corridor also harmonizes with STRING's goal of being a "green hub."

In discussions about an "extended Jutland Corridor", the STRING regions from Syddanmark to Hamburg are also seen as part of a potential development axis along the highway A7/E45.[26] This extension would include Syddanmark, parts of Schleswig-Holstein (the districts of Schleswig; Kiel, Eckernförde, Rendsburg, Neumünster), and the Hamburg metropolitan region. Here, opportunities for cooperation on specific projects and the exploitation of joint potential in the areas of infrastructure, green economy, logistics, tourism, education, and research have been proposed. Such a cooperation could be complemented by joint lobbying at national and EU level.

Indeed, due to the massive investments in building the Fehmarn Belt Fixed Link, public interest in the alternative route along the Jutland Corridor seems to have decreased. This has been a particular concern for the regions of Midtjylland (including the city of Aarhus) and Syddanmark. Since both transport corridors are part of the same trans-European network, joining forces to advance the connectivity of the Northern-European traffic system more broadly seems in the joint interest of all regions around the Kattegat. Cooperation between STRING and the Green Jutland Corridor could be a way to overcome the zero-sum thinking that often guides the debate over infrastructure insvestment.

Due to the STRING membership of its southern neighbors, the Green Jutland Corridor now appears to be an island surrounded by STRING regions. Accordingly, for the regions located in the Jutland Corridor, joining STRING could end this "isolation" and open up new development opportunities. A balance of interests between the regions of an "extended Jutland Corridor" and the Fehmarn Belt Corridor, which form a kind of "double string," would then have to be found within this double-STRING. Indeed, STRING has some experience in incorporating heterogenous members with different

[26] For more information on the "extended Jutland Corridor," see Knieling and Obersteg (n.d.) and URMA (2014).

interests, as the current membership clearly exceeds the original set of regions along the Fehmarn Belt Corridor.

An enlargement of STRING to include the regions of the Jutland Corridor could further increase the weight and thus the "critical mass" of such an extended STRING-plus. Based on the indicators used so far, the population would grow by 19 percent, and GDP would increase by almost 17 percent (Table 4a.). The area would also increase by more than a third, although this would lead to a reduction of population density by more than 10 percent. With the cities of Aarhus (301,000 inhabitants) and Aalborg (122,000 inhabitants), further metropolitan regions (by Danish standards) would be added. In addition, large cities by Norwegian standards, Kristiansand (67,000 inhabitants) and Tønsberg (56,000 inhabitants), would become members. By international standards, though, a merger into STRING-plus would not add much in terms of agglomeration forces–the proportion of the less densely populated Hinterland would grow more significantly.

In the two "enlargement countries", Denmark and Norway, the importance of STRING-plus would reach a higher level: in Denmark, all regions would be integrated into that megaregion, while in Norway, half of the population would live in STRING-plus regions, which would generate almost 40 percent of Norway's GDP (Table 4b.). In Denmark in particular, STRING-plus could become a central player in regional, cross-border economic development, depending on the institutional structure of such a megaregion and the associated distribution of competences. However, if STRING-plus was to have a relatively large weight in one country, the question arises as to how great the willingness would be to relinquish competences at the national level and to which areas the transfer of competences would be limited. Conversely, STRING-plus could also be seen as a vehicle for enforcing national interests, which would make it more difficult to balance regional interests across national borders.

Within STRING-plus, the expansion would have a corresponding impact on the regional distribution of influence: Denmark would gain weight–its share of population and GDP would be well over one-third–while the dominance of the Danish capital region would decline (Table 4c.). Midtjylland's membership would be particularly relevant here. In contrast, the shift in favor of the Norwegian STRING subregion would be relatively small. Overall, the Scandinavian weight would increase compared to the German regions. It seems rather unlikely, though, that merging STRING with the Green Jutland Corridor would strengthen national interests within STRING-plus. Rather, cross-border coalitions of interests along the two corridors seem more likely, due to a higher degree of connectivity and collaboration along the corridors.

Against this backdrop, the following aspects would be relevant if the STRING region were to merge with the Green Jutland Corridor:

- Quantitative gain: A combined STRING-plus would gain economic weight, which would increase its visibility at national and international level.
- Qualitative gain: Greater industry diversification could strengthen STRING's adaptive capacities and resilience.

Table 4: Enlarging STRING by the Green Jutland Corridor[a]

a. Dimension

	Population (m people)	Area (km^2)	GDP (m EUR)	Population Density (people/km^2)
STRING	14.4	109,410	888,757	131
STRING-plus	17.1	147,762	1,038,545	116

b. National weights

	Share of national population (p.c.)	Share of national area (p.c.)	Share of national GDP (p.c.)
STRING			
Denmark	67.1	51.3	71.9
Norway	36.5	6.5	31.2
Sweden	33.5	10.2	30.7
Germany	5.8	4.6	6.8
STRING plus			
Denmark	100.0	100.0	98.5
Norway	50.1	15.3	39.6
Sweden	33.5	10.2	30.7
Germany	5.8	4.6	6.8

c. Regional weights in STRING plus[b]

	Share of STRING plus population (p.c.)	Share of STRING plus area (p.c.)	Share of STRING plus GDP (p.c.)	Population Density (people/km^2)
Denmark STRING subregion	34.9	26.1	36.3	139
Hovedstaden	11.2	1.6	16.7	747
Byen København	4.8	0.1	9.0	*4,571*
Sjælland	5,0	4,4	3,4	118
Syddanmark	7,3	7,5	6,4	101
Midtjylland	8.0	7.9	7.1	105
Nordjylland	3.5	4.8	2.8	75
Norway: STRING sub-region	16,3	35,9	21,7	47
Oslo og Viken	11,9	15,3	17,0	81
Oslo	4,2	0,3	9,1	1,581
Agder	1,9	10,0	2,0	19
Vestfold og Telemark	2,5	10,6	2,6	25
Sweden: STRING sub-region	20,7	27,9	16,3	77
Skåne län *(with Malmö, Helsingborg, Lund)*	8,3	6,9	6,1	126
Hallands län	2,0	3,5	1,3	60
Västra Götalands län *(with Gothenburg)*	10,3	17,5	8,9	61
Germany: STRING sub-region	28,1	10,1	25,8	290
Hamburg	10,8	0,5	14,6	2,452
Schleswig-Holstein	17,3	9,6	11,2	187
Kiel	1,5	0,1	1,3	*2,116*

[a]Population data for 2024, area data for 2023/24, GDP data for 2022 (Norway: estimates for the Norwegian regions, see Table 2; Denmark: difference between the sum of the Danish regions and the specified total value from the National Accounts).— [b]Shares of STRING plus total in per cent.

Source: Eurostat (2025a, 2025b); own compilation and calculations.

- Increased connectivity of STRING-plus via road, rail, and ship, both internally and externally.
- Gain in political bargaining power: Representing all regions around the Kattegat would give the organization more leverage than representing the Eastern flank only, with a competing organization on the Western flank of the Kattegat.
- Reduced risk that functional economic areas could be fragmented by a more deeply integrated STRING in its current form.
- Greater regional heterogeneity: broadening the spectrum of interests along existing corridors and networks would make defining a joint STRING agenda more challenging than in the status quo.

Altogether, there is no economic imperative to merge the Green Jutland Corridor with STRING. However, the considerations above reveal potential complementarities that will be assessed more thoroughly in the subsequent Sections. Beyond agglomeration effects, the Jutland Corridor is of specific interest due to its geographic location. As the STRING regions, the regions belonging to the Jutland Corridor are bordering the Baltic Sea around the Kattegat. Accordingly, they will be similarly affected by some external shocks like security threats (e.g., sabotage of underwater infrastructure, disturbance of shipping routes) or climate change (e.g., rising seawater level and temperature). Consequently, there is clear potential for cooperation with STRING that goes beyond purely economic issues–even if such cooperation must not necessarily lead to an institutional integration. Section 3.3 above discussed a variety of institutional arrangements in the governance of megaregions. Specifically, the Randstad and the Rhine-Ruhr show that megaregions can be structured as an ensemble of sub-regions with varying degrees of integration under a joint institutional umbrella.

4 Empirical Analysis: Economic Integration of STRING

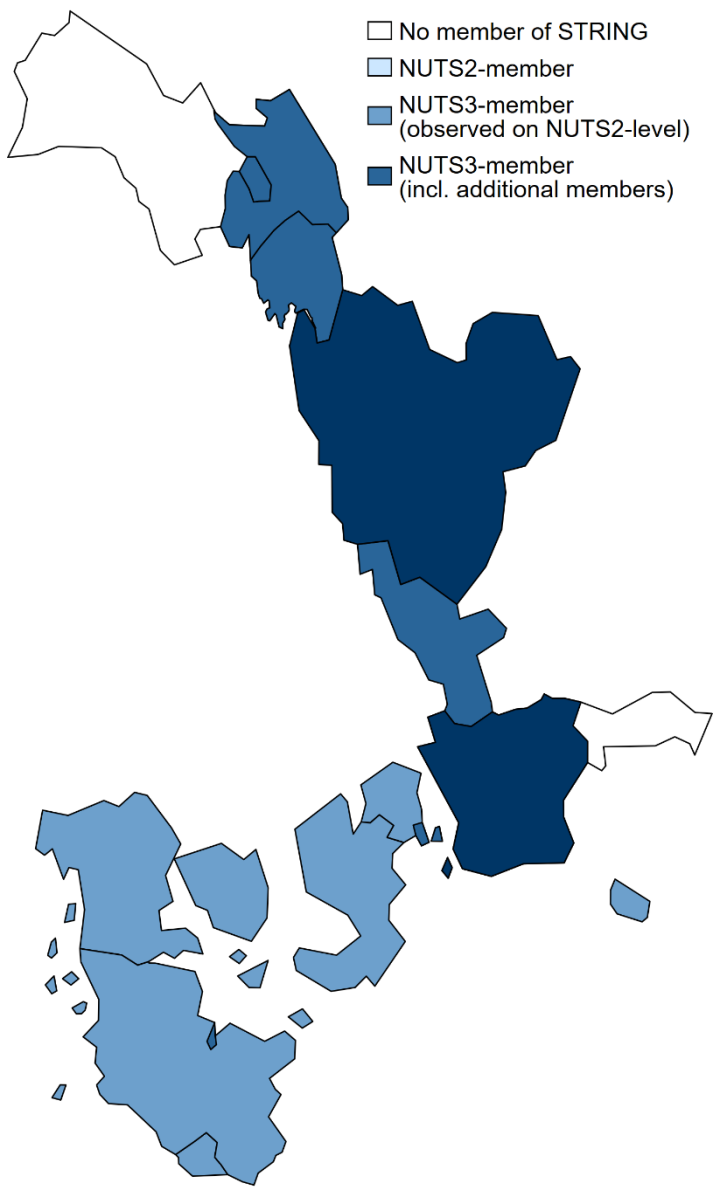
4.1 Concept and Data

This chapter takes stock of the economic integration of the STRING megaregion, using administrative regional-level data from Eurostat (2025) and the European Commission's Directorate General for Regional and Urban Policy (ARDECO, 2025). The data has been chosen to ensure international comparability over time. Due to data availability, the analysis is mainly focused on the NUTS-2 level, following the European Union's classification of territorial units (Nomenclature des Unités Territoriales Statistiques). Accordingly, since STRING membership is defined on the more disaggregated NUTS-3 level, the area analyzed is slightly larger than the territory of the STRING members. Moreover, not all single NUTS-3 members can be observed if they are nested in a broader NUTS-2 region. For instance, it is not possible to differentiate between Schleswig-Holstein (NUTS-2) and the city of Kiel (NUTS-3, contained in the NUTS-2 region of Schleswig Holstein). Figure 4 illustrates the overlap between the STRING members and the area analyzed on NUTS2-level. Subsequently, we refer to the NUTS2-regions contained in STRING as STRING-region. Territorial boundaries are held constant over time, i.e., previous changes in the membership structure are ignored.[27]

Empirical results are interpreted in the light of the New Economic Geography. This rests on the assumption that economically successful regions specialize according to "endogenous factors", i.e., regional characteristics that give any region a competitive edge over others. Economic growth is largely driven by agglomeration dynamics. While it is productive to concentrate economic activities in central regions, more peripheral regions may benefit from the development of the centers if they are economically connected, e.g., through commuting on the labor markets, or along value chains in production networks. The strength of such regional connections is largely determined by distance parameters, taking into account travel time, transportation costs, but also technological and cultural similarities, c.f. Section 2.2. Against this backdrop, economic growth of a megaregion is fueled by the development of its inter-connected centers, at the same time providing growth-trajectories for the less-agglomerated areas that are part of the megaregion's economic network.

[27] On the Norwegian side, the data report on Oslo og Viken (Nuts-Code NO08) as STRING-region and on Agder og Sør-Østlandet (Nuts-Code NO09) as region of the Jutland-Corridor. Due to territorial reorganizations, values for these NUTS2-regions are not always observable in the Eurostat-data for the years before 2015, specifically when they stem from the European Labor Force Survey. If possible, missing values from the earlier years have been imputed with the values observed for Oslo og Akershaus (NO01, replacing NO08) and with the mean values observed for Agder og Rogaland and Sør-Østlandet (NO03 and NO04 replacing NO09). ARDECO-data correct for the break in the time series, as long as no purchasing power parities are required.

Figure 4: Correspondence Between Area of Analysis and STRING-regions



Notes: The figure shows all areas observed for the subsequent analyses. STRING-members are depicted in blue. The map differentiates between NUTS2-level members, NUTS3-level members (that are not observed in isolation, but included in the more aggregate NUTS2-level data observed) and NUTS3-level members that additionally contain independent municipality-level members. Accordingly, white areas are included in the analyses, although they do not belong to STRING. Source: Eurostat/ARDECO, own illustration and calculations.

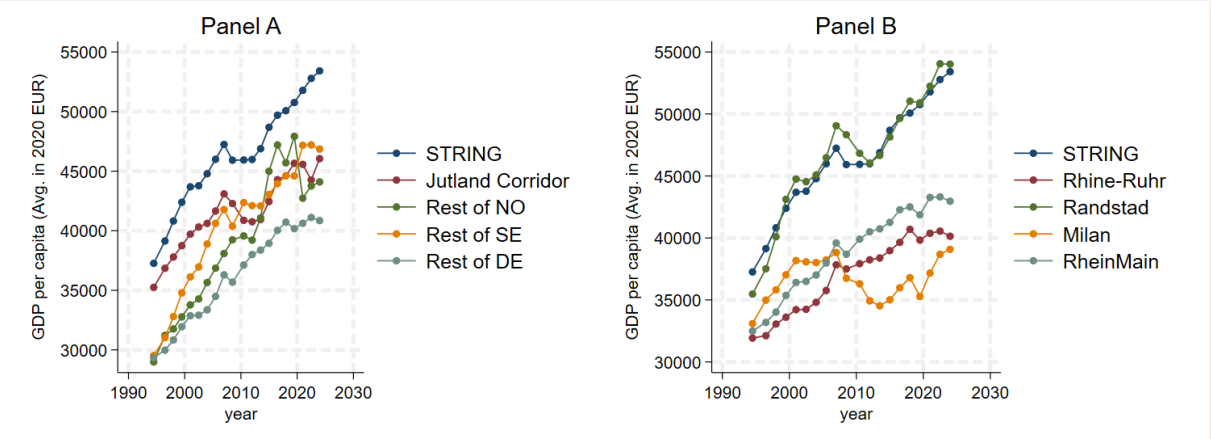
4.2 Overall Economic Development

Economic Growth

The most fundamental indicator for economic development is Gross Domestic Product (GDP) per capita, i.e., the value of all goods and services produced in a region, divided by the number of residents. As a one-size-fits-all measure, it gives an impression of a region's state of economic development, its productivity, and wealth. Figure 5 describes the development of GDP per capita in the STRING-region over time. Panel A

(left-hand side) compares the development of STRING to the Green Jutland Corridor and all other regions of the STRING-countries.[28] Panel B (right-hand side) compares STRING to the other European megaregions discussed in Section 3, i.e., the Rhine-Ruhr Metropolitan Region, Randstad, the Milan Metropolitan Area, and FrankfurtRhine-Main. To account for the heterogeneity of these comparison groups, Figure 5 reports on the average region contained in each group.[29]

Figure 5: GDP Per Capita Over Time—Broader Regions



Notes: The figure shows binscatter-plots, reporting on an average NUTS2-region contained in the broader regions described. The left panel A compares GDP per capita in the STRING-regions to the Jutland Corridor and the rest of Norway (NO), Sweden (SE), and Germany (DE). The right panel B compares STRING to other European Megaregions. Source: Eurostat/ARDECO, own illustration and calculations.

The data show that the STRING-region has grown considerably over the last two decades. All values are expressed in 2020 EUR, i.e., changes in price levels (inflation) are corrected for. Starting at a comparatively high level of 36871 EUR/inhabitant in 1994, average GDP per capita steadily increased up to 47243 EUR/inhabitant in 2007, before the financial crisis hit. The STRING-region recovered from 2010 on, and reached 48685 EUR/inhabitant in 2015. By 2024, average GDP per capita had risen to 53414 EUR/inhabitant. This is 13 percent more than in 2014 and 19 percent more than in 2004.

The left panel A reveals that the STRING-region has grown more dynamically than the national economies STRING is part of. Particularly in the most recent years, STRING has grown against the national trends, while other Norwegian, Swedish, Danish and specifically German regions rather stagnated. The right panel B compares STRING to other European megaregions. The growth-patterns of STRING closely match the dynamics of the Randstad-region in the Netherlands. The Rhine-Ruhr Metropolitan Region and the FrankfurtRhineMain-region in Germany, as well as the Milan Metropolitan Area have followed flatter growth-trajectories.

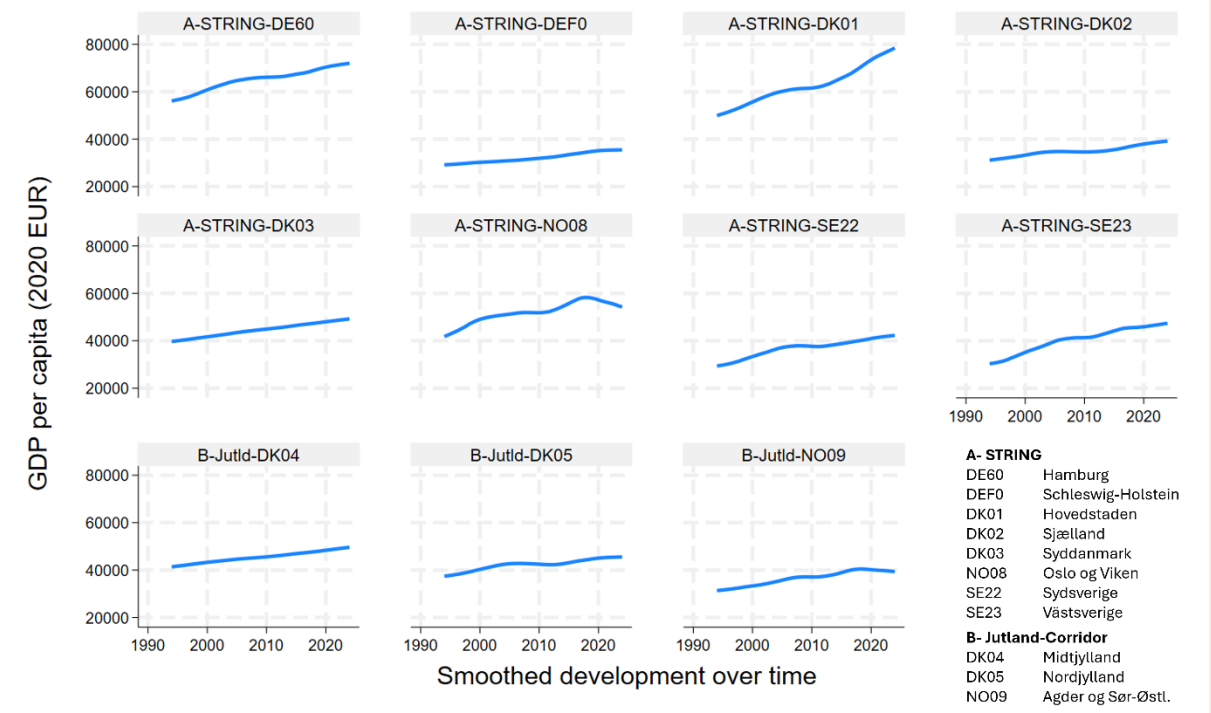
Figure 6 looks more closely into economic growth within the STRING-region. The development of GDP per capita is reported for each member region (on NUTS-2-level)

[28] Since Denmark is fully contained in STRING and the Green Jutland Corridor, there are no other Danish regions for reference.

[29] This explains minor deviation from the figures presented in Section 3. Section 4 looks at averages instead of aggregate values mainly for expositional reasons. Qualitatively, the results would not change substantially if aggregate values were considered.

separately. For reference, economic development of the neighboring regions belonging to the Green Jutland Corridor is shown as well.

Figure 6: GDP Per Capita Over Time—Regional Variation Within STRING



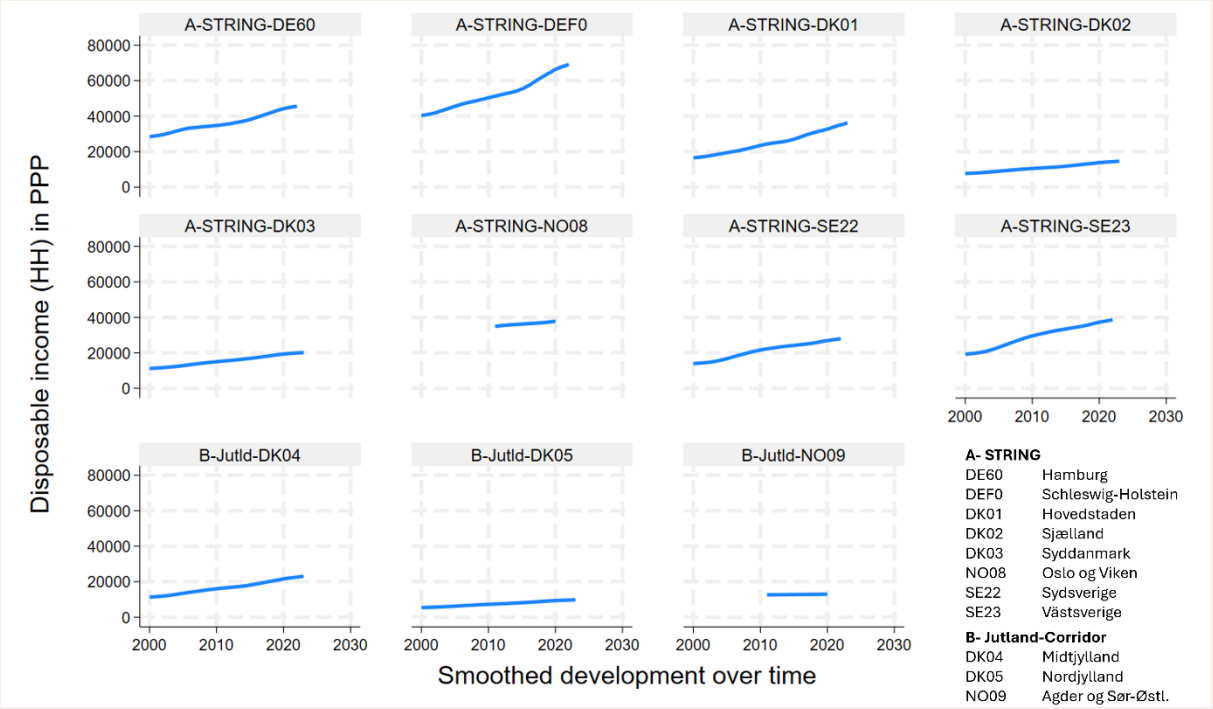
Notes: The figure shows smoothed time-series plots, reporting on the development of GDP per capita over time for all NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

As can be seen from Figure 6, the overall positive development of the STRING region is driven by the growth of the economic centers around Oslo (NO08), Hamburg (DE60), and particularly Copenhagen (DK01). In line with theory, adjacent areas grew significantly as well, particularly around Gothenburg (SE21) and in Southern Denmark (DK03). Essentially, all STRING-members developed well over the last 20 years. Appendix Figure A.1 shows very similar trends for regional Gross Value Added (GVA) per capita. GVA subtracts the value of intermediate inputs from GDP. Accordingly, the growth of the STRING-region is indeed a result of production (and productivity) within that area.

Related Developments

Figure 7 depicts the development of households' net disposable income, measured in purchasing power parities. Accordingly, differences in the costs of living between urban centers like Copenhagen or Hamburg, and less-agglomerated areas like Southern Denmark or Schleswig-Holstein, cancel out.

Figure 7: Households' Net Disposable Income—Regional Variation Within STRING



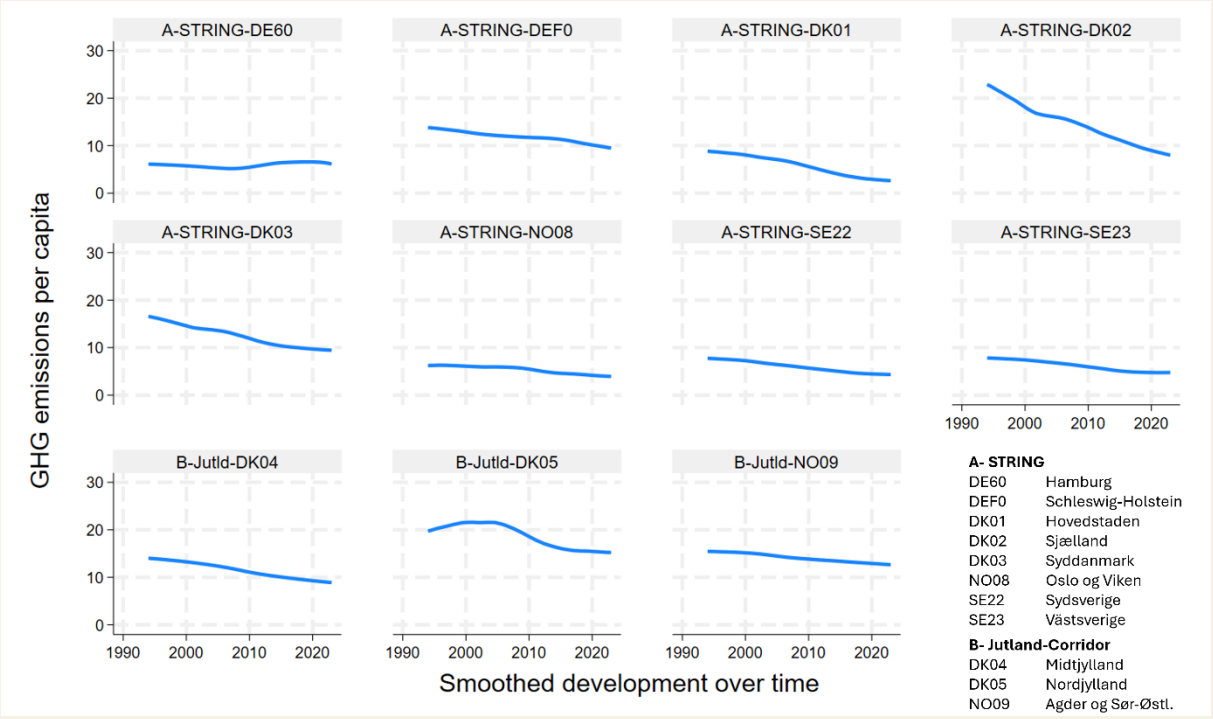
Notes: The figure shows smoothed time-series plots, reporting on the development of households' net disposable income (measured in purchasing power parities) over time for all NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

Figure 7 shows how people living in the STRING-region benefitted from the overall positive economic development. The graphs show the development of households' net disposable income, after taxes and duties. What is more, all values are reported in purchasing power parities, accounting for the differences in price levels between the regions. The figure indicates that growth in the urban agglomerations correspondents to increasing costs of living. Accounting for price differences shows that households' spending capacity in less-agglomerated areas has increased quite similarly as in the urban centers—if not more, as, e.g., a comparison between Hamburg (DE60) and Schleswig-Holstein (DEF0) reveals.

Despite economic growth and increasing production, all STRING members have managed to reduce their Greenhouse gas emissions, as Figure 8 confirms. It reports on regional emissions of all Greenhouse gases, measured in Kilotons of CO2-equivalents per inhabitant.

On average, regional Greenhouse gas emissions decreased from 7.40 Kilotons per inhabitant to 5.47 Kilotons per inhabitant from 2013 to 2023, i.e., by more than 25 percent. The Danish members have been particularly successful in reducing emissions. In 2023, the lowest emissions per capita were observed in the urban agglomerations, followed by the Swedish regions.

Figure 8: Greenhouse Gas Emissions Per Capita—Regional Variation Within STRING

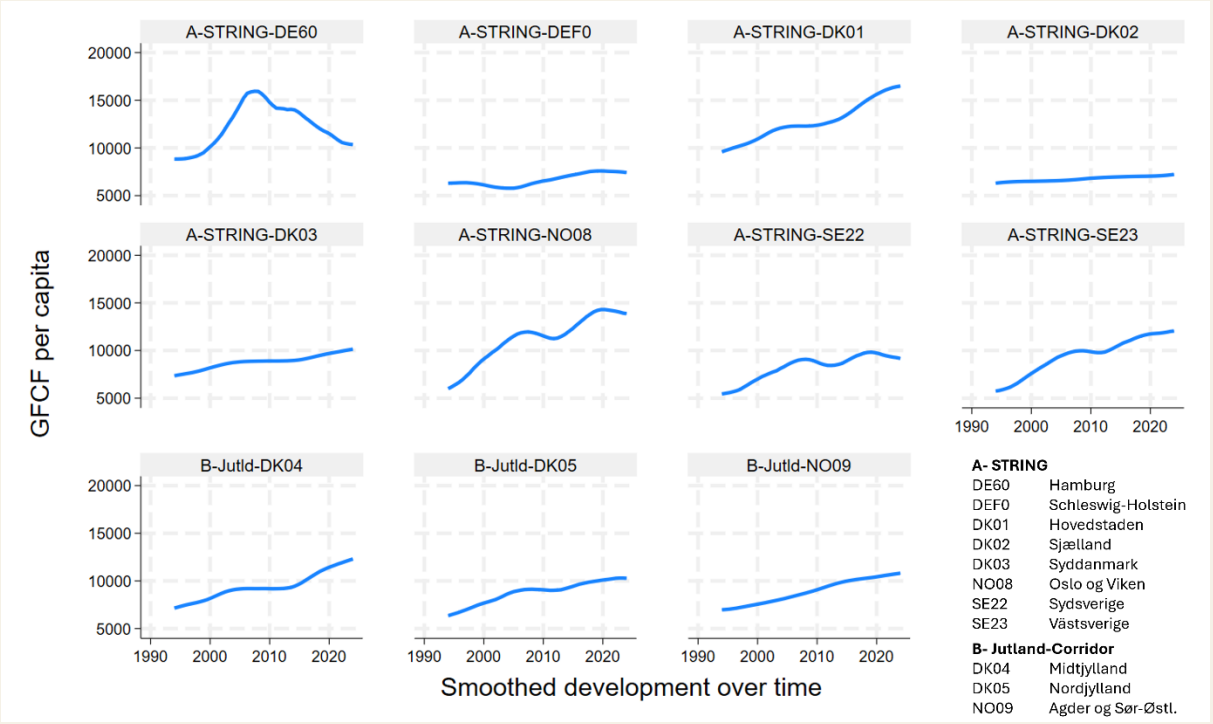


Notes: The figure shows smoothed time-series plots, reporting on the development of Greenhouse gas emissions per capita (measured in Kilotons of CO2-equivalents) over time for all NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

STRING's growth prospects strongly rest on the region's ability to attract investments. Figure 9 plots the development of gross fixed capital formation (GFCF) over time, i.e. all investments into assets suitable to produce goods and services. Again, values are expressed in 2020 EUR and in per-capita terms, i.e. in relation to the regional population.

While all members saw regional investments increase over time, there are significant differences in the levels of regional investments as well as in the trend growth. Hamburg (DE60), after a strong peak in 2008, has faced declining investments over the last decade. The regions around Copenhagen (DK01), Oslo (NO08) and Gothenburg (SE23) experienced comparatively steep increases in regional investments, that flattened out over the last couple of years. In comparison, less-agglomerated areas like Southern Denmark (DEF0) or Schleswig-Holstein (DEF0) seem to have become more attractive for investments in the recent years. Corresponding data for the development of the regional capital stocks can be found in Appendix Figure A.2. They show a steady increase for all members but Hamburg, where the capital stock declined most recently. Moreover, Appendix Figure A.3 shows the development of GFCF per capita for other European regions, most of which also faced declining investments in the recent years. Altogether, the STRING-region has been successful in attracting investments. For the future development, it seems important to cultivate this attractiveness for investors from within and from abroad.

Figure 9: Investments (GFCF) Per Capita—Regional Variation Within STRING



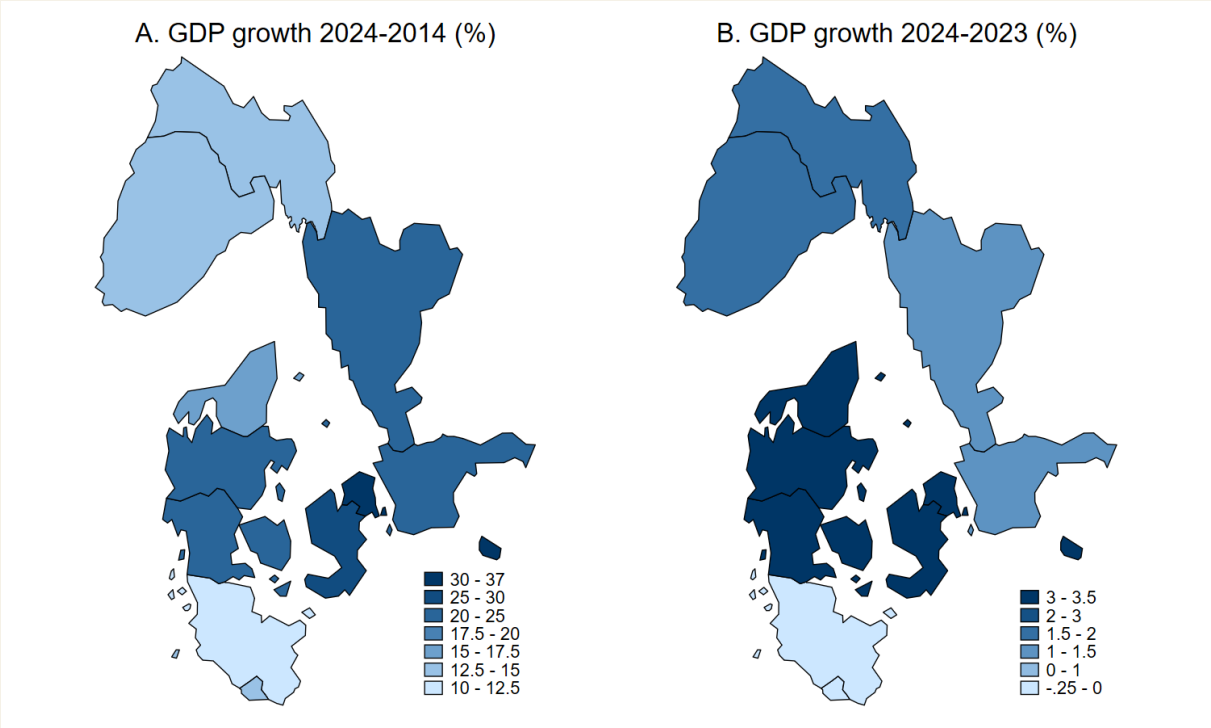
Notes: The figure shows smoothed time-series plots, reporting on the development of gross fixed capital formations (measured in 2020 EUR per capita) over time for all NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

Recent Growth Dynamics

Figure 10 summarizes the economic development of STRING and its neighbors around the Kattegat by mapping GDP growth rates. The left panel A reports growth rates over the last ten years observed (2014–2024). The right panel B reports regional GDP growth in 2024, as compared to 2023. Darker blue indicates higher growth rates.

The maps illustrate the economic success of the STRING-region. Over one decade from 2014 to 2024 (left panel), the regional economies of STRING grew between 11.5 Percent (Schleswig-Holstein) and 37 Percent (Hovedstaden), with an average of 21.7 Percent. The right panel suggests that the national business cycles still have a strong influence, though. While in 2024, the German regions stagnated with a slight decrease in GDP of –0.2 Percent, the Swedish regions grew by around 1 Percent, the Norwegian regions by around 1.6 Percent, and the Danish regions by around 3.4 Percent. Still, STRING developed better than the national averages. This development is driven by the urban centers, but it spills over to the less-agglomerated areas. Even if this does not yet suggest that STRING can be interpreted as fully integrated economic area on its own development path, one can still concede that, altogether, STRING seems on a viable growth trajectory.

Figure 10: Growth Rates STRING and Green Jutland Corridor



Notes: The figure shows GDP growth rates over 10 years (2014–2024, left panel) and over 1 year (2023–2024, right panel) on the NUTS2-level for the STRING region and the Green Jutland Corridor. Source: Eurostat/AR-DECO, own illustration and calculations.

4.3 Demographic Development

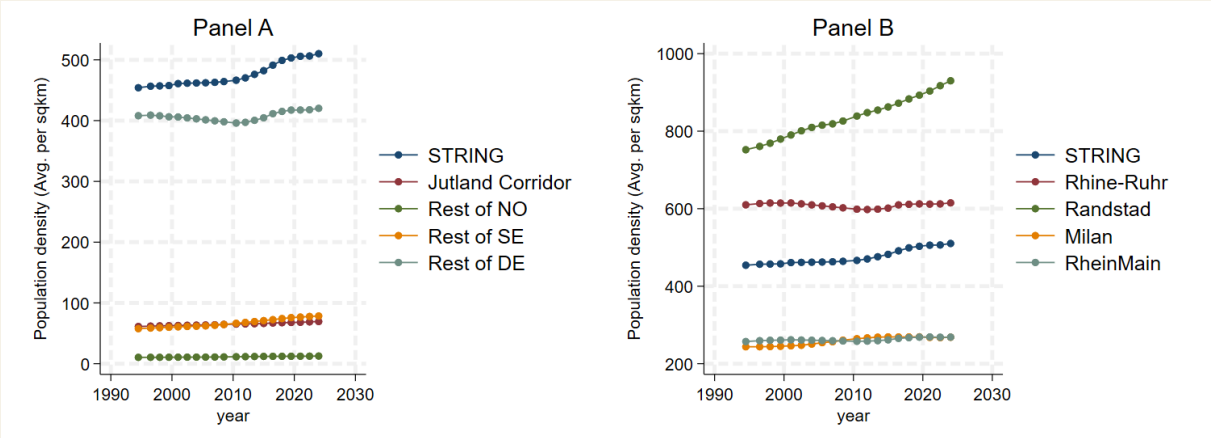
Population Growth and Ageing

STRING has grown not only in economic terms–but also in terms of its population. In 2024, 14.5 million people were living in the NUTS-2-regions assigned to STRING. This is 7.8 Percent more than in 2014, and 14 percent more than in 2004. Accordingly, population density increased. Figure 11 compares this dynamic to the development of the population of the Green Jutland Corridor and the national economies in Northern Europe net of STRING (left panel), as well as the development of population density in other European megaregions (right panel).[30]

Starting on a high level with 453 inhabitants per sqkm on average, STRING constantly densified over time, with a steep increase in population since around 2010, that clearly exceeds the national trends (left panel). Thus, in terms of population density, STRING has been catching up with the Rhine-Ruhr area (right panel). The Randstad region, that experienced similar economic growth as STRING, grew even more dynamically in terms of population.

[30] Throughout Section 4, we report mean values instead of aggregates when comparing megaregions and national economies. This explains differences between the figures presented here and the tables presented in Section 3. Mean values are meant to make economic areas of very different sizes more comparable. Moreover, we are particularly interested in the development of agglomeration dynamics over time. Mean values are more informative in this respect. For instance, STRING's mean population density may grow not only due to immigration (as in the aggregate), but also if residents spread more evenly within the region.

Figure 11: Population Density Over Time–Broader Regions



Notes: The figure shows binscatter-plots, reporting on an average NUTS2-region contained in the broader regions described. The left panel compares population density in the STRING-regions to the Green Jutland Corridor and the rest of Norway (NO), Sweden (SE), and Germany (DE). The right panel compares STRING to other European Megaregions. Source: Eurostat/ARDECO, own illustration and calculations.

However, population density varies significantly between the STRING-members, as Figure 12 reveals for the year 2024. With 2608 inhabitants per square kilometer, Hamburg is by far the most densely populated area, followed by Hovedstaden around Copenhagen (785 per sqkm) and Schleswig-Holstein (192 per sqkm). On the contrary, Västsverige has 72 inhabitants per sqkm.

Figure 13 takes a closer look into the population dynamics in the STRING-region. NUTS-2 regions belonging to the Green Jutland Corridor are referenced for comparison. For each region, the local population in the year 1994 is set to be unity. For the years afterwards, the graphs show the local population in relation to the base year 1994.

For all member regions, the local population has grown considerably over time. Oslo og Viken (NO08) experienced the steepest increase, with a population growth of more than 40 percent over the 20 years considered. Likewise, the Swedish regions as well Hovedstaden (DK01) grew very dynamically. Against the background of demographic change, this agglomeration dynamics speak for the attractiveness of the STRING-region. The continued ageing of European societies is expected to foster urbanization. Specifically, young and well-educated people are expected to continue to move into cities, putting pressure on the development prospects of more remote regions. Against this backdrop, (socially) sustainable growth implies that in a megaregion, not only the urban centers grow, but also the less agglomerated areas. In the STRING-region, this seems to be the case.

Still, the STRING members are not immune to demographic change, as Figure 14 reveals. It plots the share of residents above the age of 65 in the overall population, and the development of this share over time.

Despite population growth, STRING has been ageing. However, the members have been ageing to different degrees, and with different dynamics. Specifically, there are notable level-differences in the shares of people of retirement age. It tends to be lower in the regions around Copenhagen, Oslo, and Hamburg. The growth of the share of

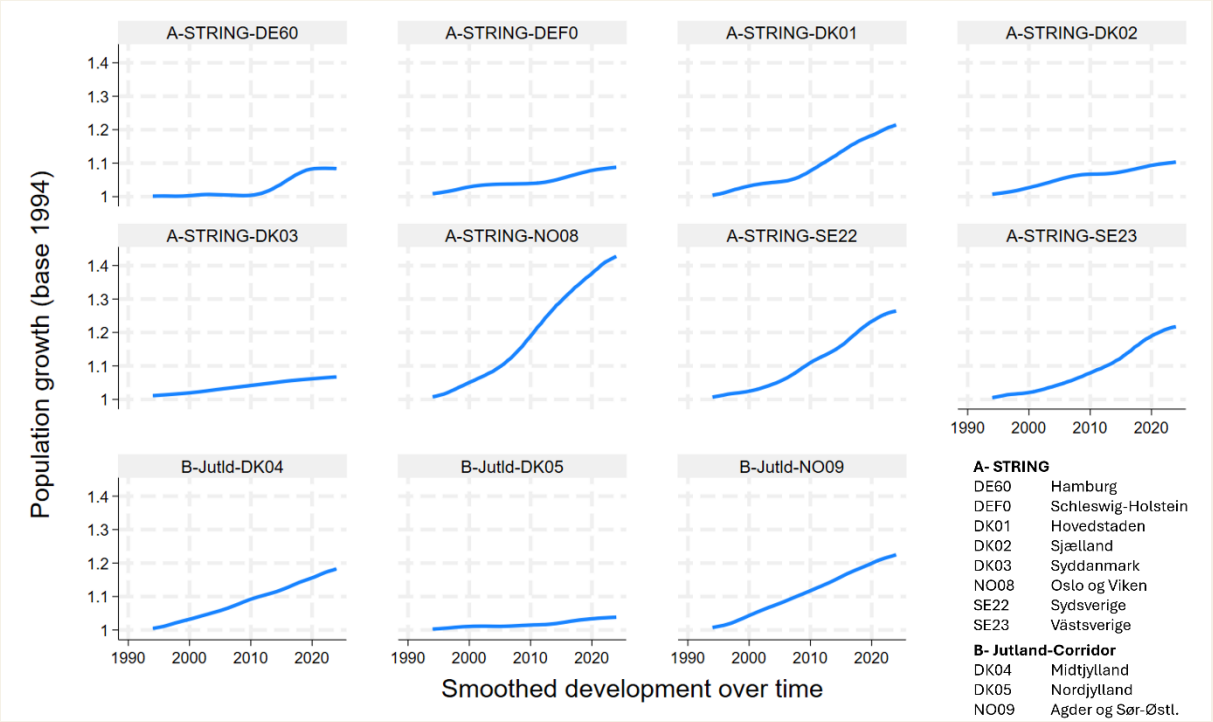
inhabitants 65 plus goes at the expense of the working-age population, as Figure 15 lays out.

The share of the working-age population has decreased considerably in all STRING regions, particularly since the year 2010. The decrease is much flatter around the urban centers Hamburg (DE60), Copenhagen (DK01) and Oslo (NO08). Figure 16 completes the picture by looking at the share of residents below 15 years of age.

Figure 12: Population Density STRING and the Green Jutland Corridor 2024

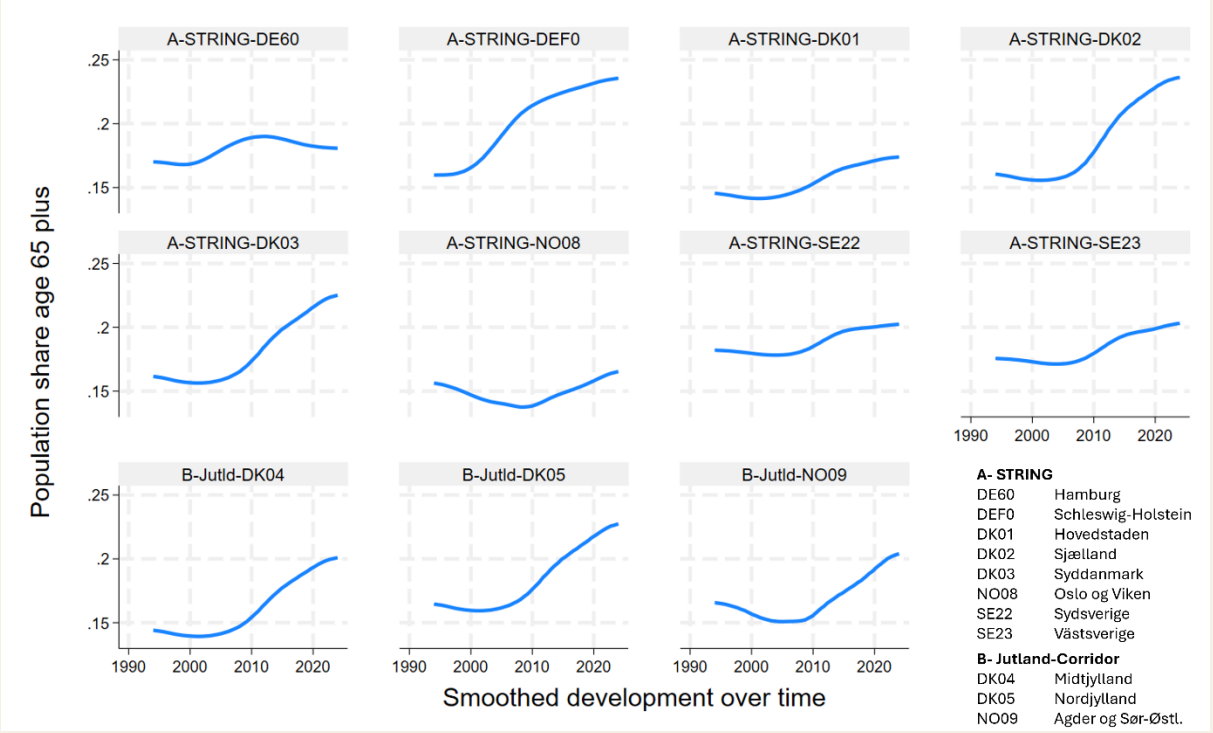
Notes: The figure shows population density in 2024 on the NUTS2-level for the STRING region and the Green Jutland Corridor. Source: Eurostat/ARDECO, own illustration and calculations.

Figure 13: Population Development Over Time—Regional Variation Within STRING



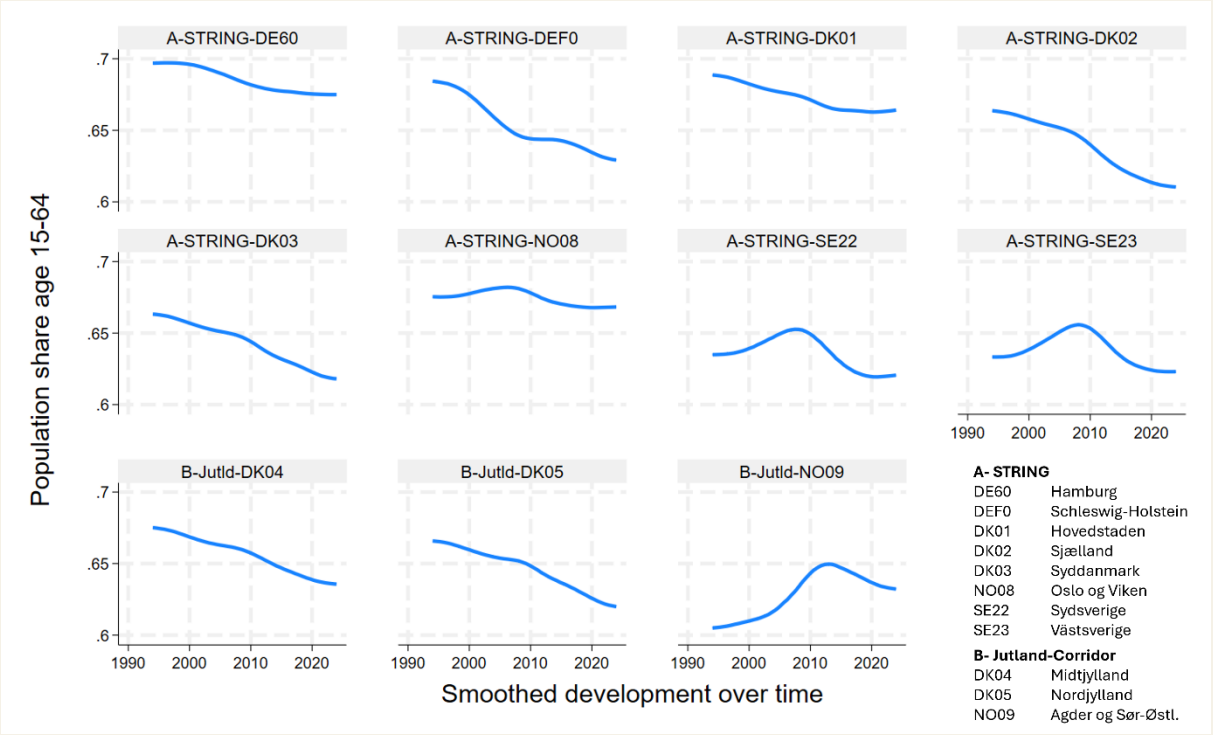
Notes: The figure shows smoothed time-series plots, reporting on the development of regional population in relation to the year 1994 (population==1) for all NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

Figure 14: Population Share 65 Years and Older—Regional Variation Within STRING



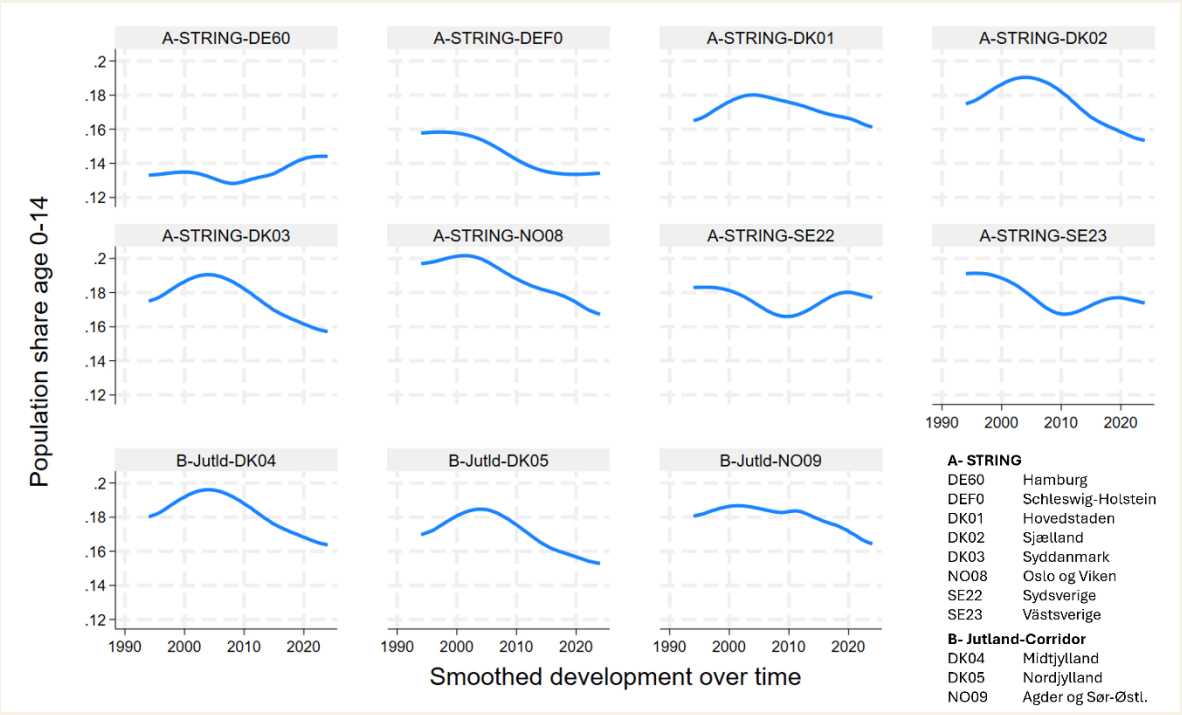
Notes: The figure shows smoothed time-series plots, reporting on the development of the share of local residents being 65 years of age or older for all NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

Figure 15: Population Share 15–64 Years of Age—Regional Variation Within STRING



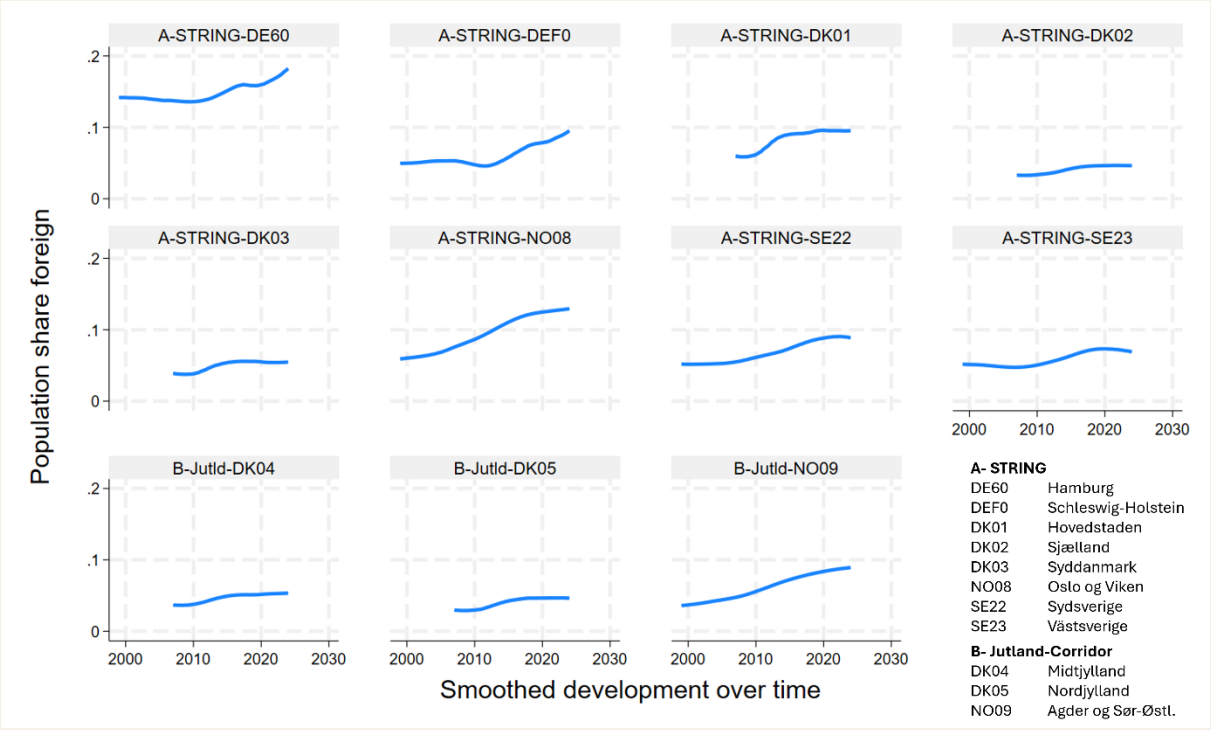
Notes: The figure shows smoothed time-series plots, reporting on the development of the share of local residents being 15 to 64 years of age for all NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

Figure 16: Population Share Below 15 Years of Age—Regional Variation Within STRING



Notes: The figure shows smoothed time-series plots, reporting on the development of the share of local residents below the age of 15 for all NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

Figure 17: Share of Foreign Inhabitants—Regional Variation Within STRING



Notes: The figure shows smoothed time-series plots, reporting on the development of the share of foreign citizens living in the NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B).
Source: Eurostat/ARDECO, own illustration and calculations.

Over the last years, only Hamburg managed to increase the share of young residents. For all other members, the share of young residents has been shrinking, specifically over the last couple of years. The decline seems yet moderate, but it is expected to continue, furthering the ageing of society and exacerbating the problems related to demographic change.

One way to mitigate the effects of demographic change is immigration. Figure 17 informs about the share of foreign citizens living in the STRING regions.

Against the backdrop of a growing population, STRING has attracted ever-more residents with foreign citizenship, whose population share increased in all member regions. While this trend seems to continue for the German regions, it has recently flattened out for the other members.

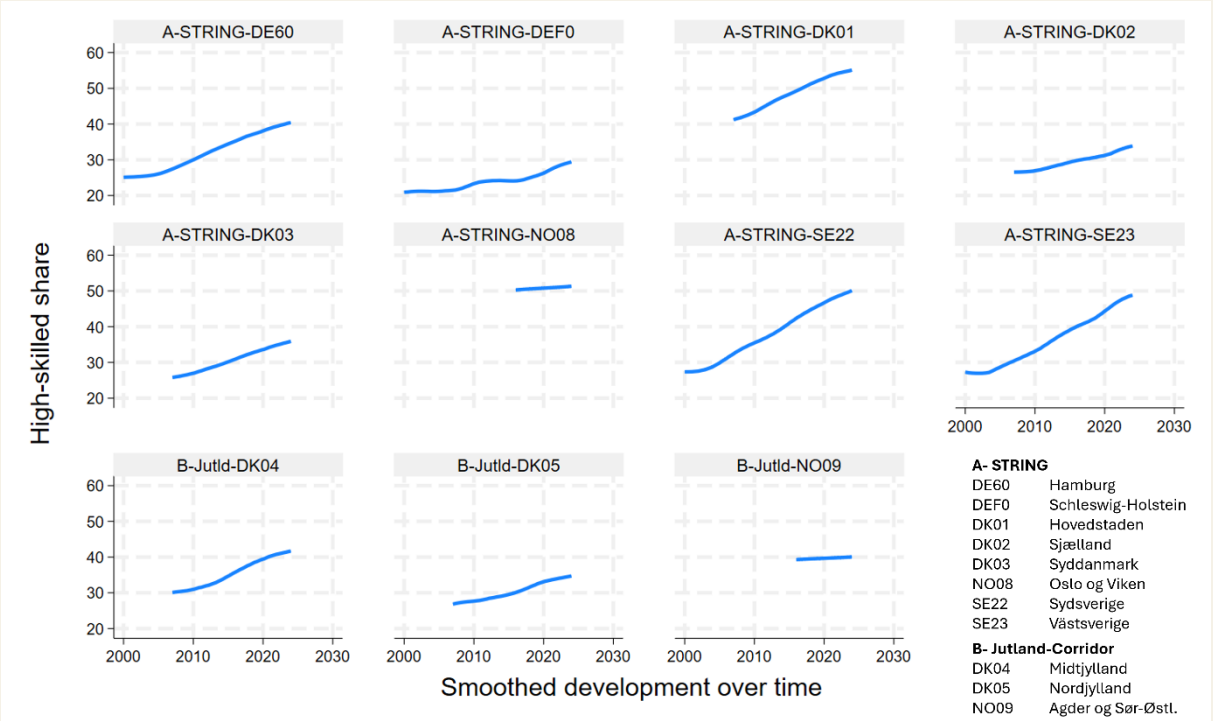
Skill Composition

In an ageing society, productivity must increase to compensate for the shrinking labor force. Thus, education and training of the workforce gains importance. Figure 18 plots the share of people between 25 and 64 years of age with a high level of formal education.[31]

The share of high-skilled individuals has increased in all STRING regions. However, significant level differences remain. In Hovedstaden (DK01), Oslo og Viken (NO08) and

[31] More precisely, this is the share in the population between 25 and 64 years of age with tertiary education according to the International Standard Classification of Education (ISCED, levels 5-8).

Figure 18: Share of High-Skilled—Regional Variation Within STRING



Notes: The figure shows smoothed time-series plots, reporting on the development of the share of individuals aged 25–64 with a high level of formal education in the NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

Sydsverige (SE22), a majority is now (2024) highly educated with a tertiary degree. In Västsverige (SE23), the share is 50 Percent. On the contrary, the share of highly educated people (in the population aged 25–64) in Schleswig-Holstein (DEF0) and Sjælland (DK02) lies between 32 and 35 Percent.

This development is partly mirrored in the share of individuals aged 25–64 with medium levels of formal education. Figure 19 shows the corresponding graphs.[32]

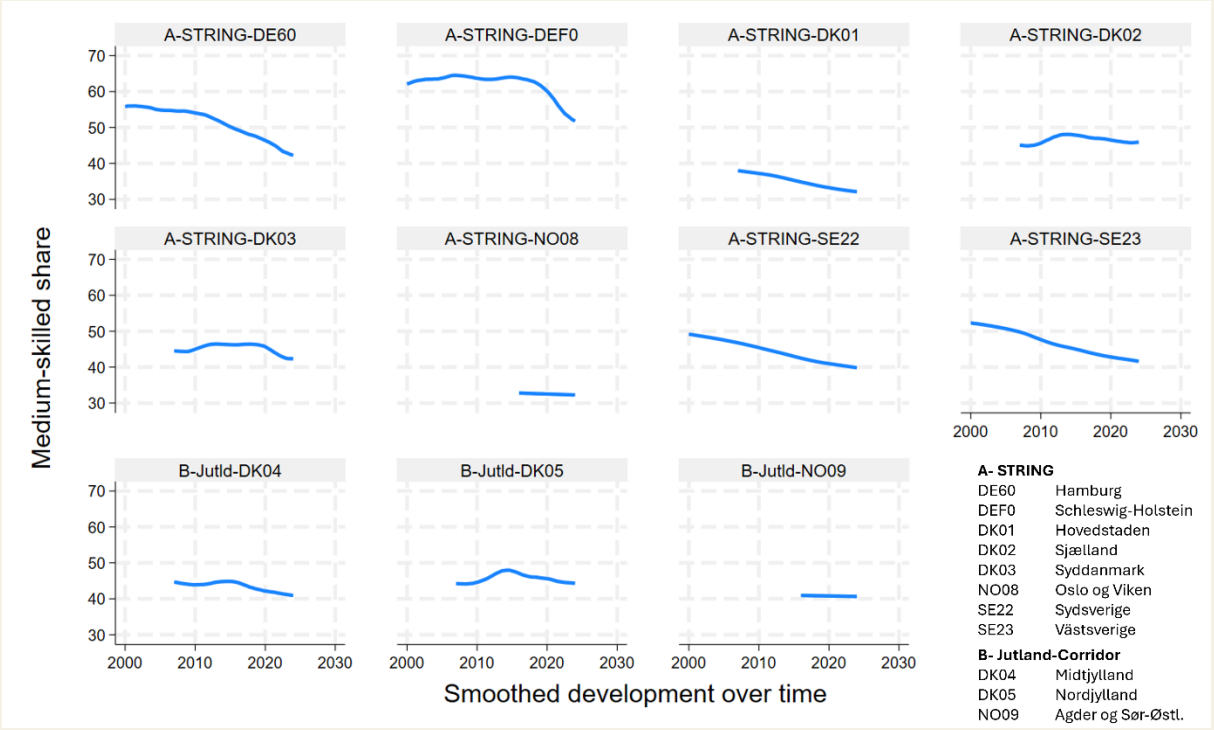
The increase in the share of high-skilled individuals living in the STRING regions mainly comes at the expense of medium-skilled individuals. Consistently, their share has decreased, but to varying degrees. Consequently, the remaining share of individuals with low levels of formal education has developed differently in the STRING-regions, as Figure 20 confirms.[33]

The development of the share of low-skilled individuals (in the age-group between 25 and 64 years) shows the most pronounced variation between the STRING-members. While it sharply declined in some regions, it moderately declined in others and even increased in Schleswig-Holstein (DEF0). Moreover, significant level differences remain.

[32] More precisely, this is the share in the population between 25 and 64 years of age with upper-secondary and post-secondary but no tertiary education, according to the International Standard Classification of Education (ISCED, levels 3-4).

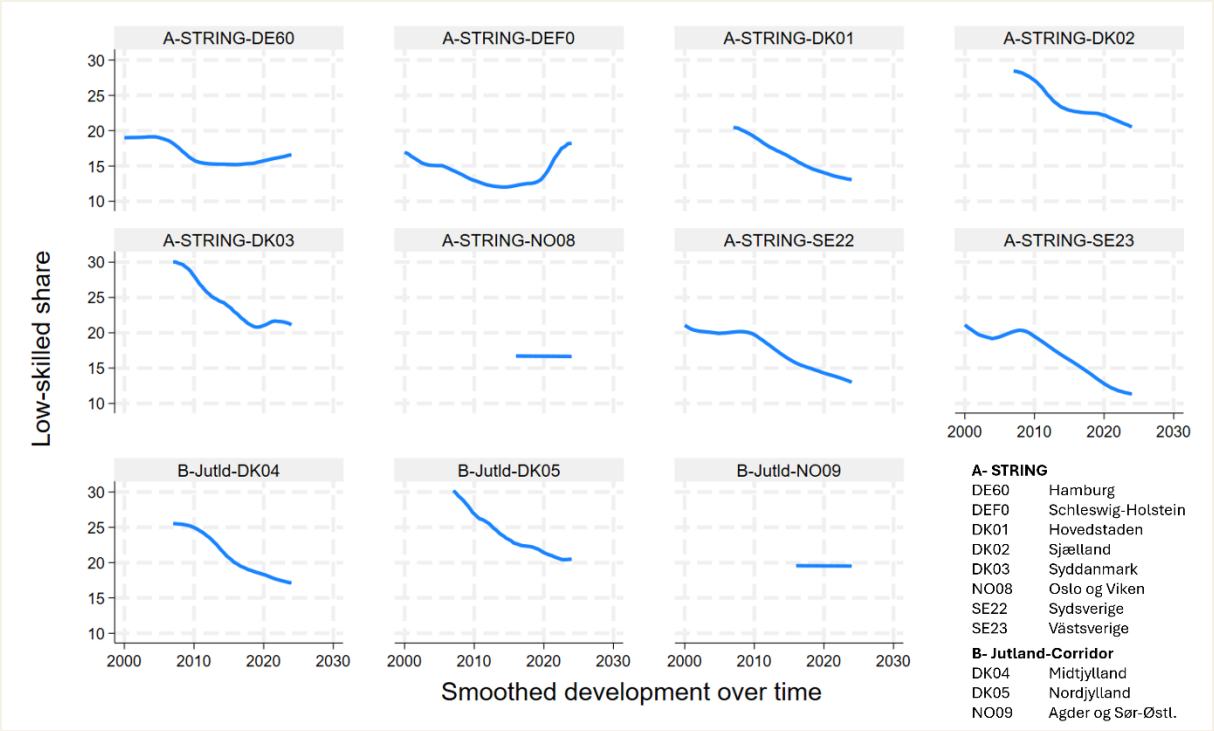
[33] More precisely, Figure 20 reports on the share of individuals in the population between 25 and 64 years of age with lower-secondary, primary, and less than primary education, according to the International Standard Classification of Education (ISCED, levels 0-2).

Figure 19: Share of Medium-Skilled—Regional Variation Within STRING



Notes: The figure shows smoothed time-series plots, reporting on the development of the share of individuals aged 25-64 with medium level of formal education in the NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

Figure 20: Share of Low-Skilled—Regional Variation Within STRING



Notes: The figure shows smoothed time-series plots, reporting on the development of the share of individuals aged 25-64 with low level of formal education in the NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

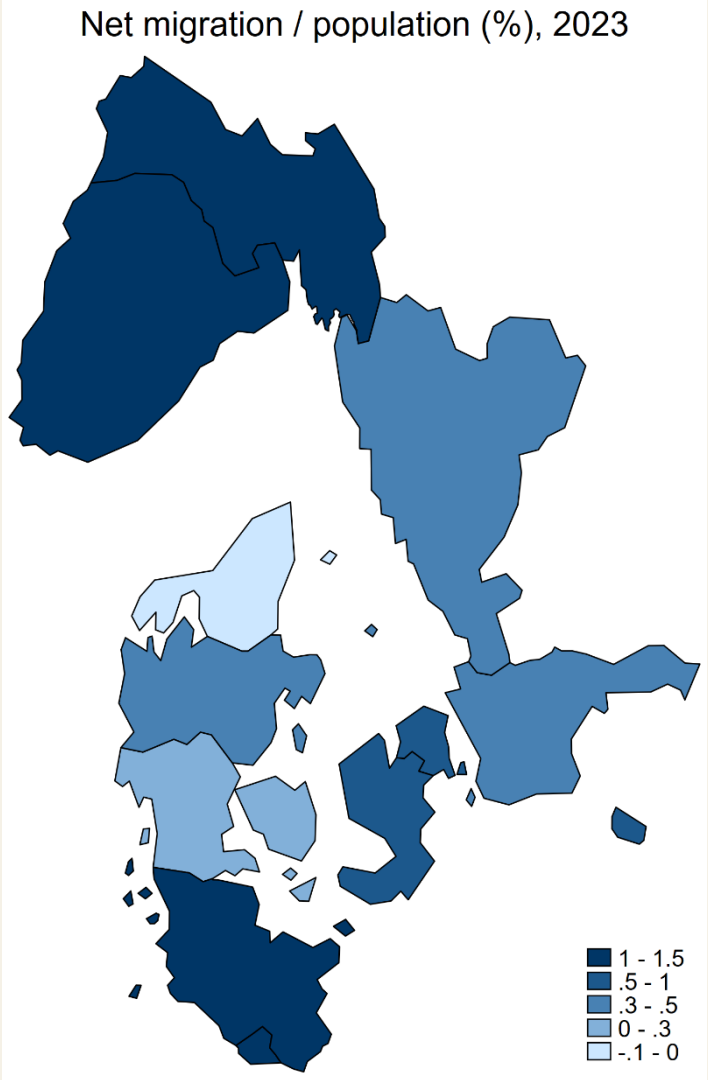
Altogether, against the backdrop of an increasing population but a decreasing share of the workforce, the observed increase of high-skilled individuals in the workforce is a positive indication for the development perspectives of STRING. In line with theory, agglomeration forces attract skilled labor. The obvious differences in the composition of the less-skilled workforce may well relate to differences in the sectoral specialization of the STRING-members, an issue to be discussed subsequently in Section 5.2.

For completeness, Appendix Figure A.4 shows the development STRING's female population share over time. While there is some variation over time and between regions, the magnitude of variation is small. Overall, there is a tendency for the female population share to slightly decline over time.

Recent Population Dynamics

To wrap up, Figure 21 shows the net migration rate for the STRING regions in the most recent year observed, i.e., the number of people moving into a region, minus the number of people moving out of that region, divided by the overall population, all in 2023.

Figure 21: Net Migration Rates STRING and Jutland Corridor



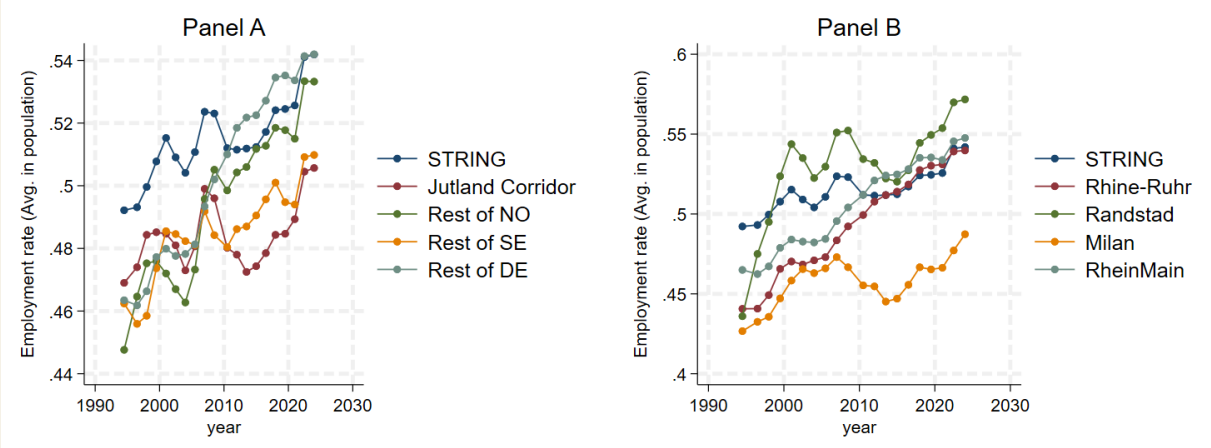
Notes: The map depict net migration rates for the year 2023, i.e., (immigration-outmigration)/population.
Source: Eurostat/ARDECO, own illustration and calculations.

In the last year observed in the data (2023), all STRING regions attracted more immigrants than they lost emigrants. Accordingly, STRING continues to grow. The data suggest that the region is particularly attractive for high-skilled immigrants. Still, demographic change is also affecting the STRING-region, gradually diminishing the workforce. In general, demographic change is expected to exacerbate urbanization tendencies. An intensified cooperation across administrative boarders may help to cope with the resulting frictions between urban centers and more peripheral regions.

4.4 Labor Market Development

One characteristic of megaregions is integrated labor markets. Individuals commute within the region, and labor market developments are aligned. As a broad overview, Figure 22 shows the development of employment rates in the STRING-region, compared to the Green Jutland Corridor and the remainder of the national economies (left panel), and other European regions (right panel). Employment rates are measured as the share of employed persons in the regional population.

Figure 22: Employment Rates Over Time—Broader Regions



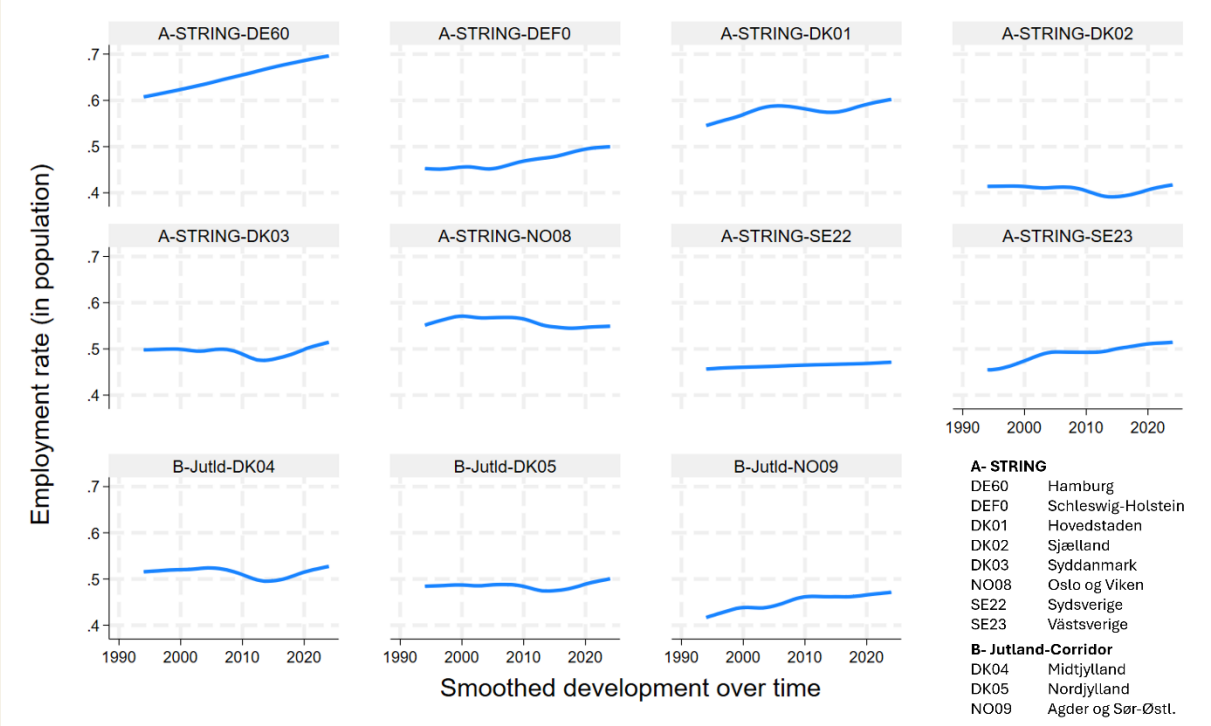
Notes: The figure shows binscatter-plots, reporting on an average NUTS2-region contained in the broader regions described. The left panel compares employment rates (the share of employed persons in the local population) in the STRING-regions to the Green Jutland Corridor and the rest of Norway (NO), Sweden (SE), and Germany (DE). The right panel compares STRING to other European Megaregions. Source: Eurostat/ARDECO, own illustration and calculations.

Starting at a comparatively high level of 49 Percent in 1994 (left panel), STRING's average employment rate increased to 53 percent, and stagnated after the financial crisis at a slightly lower level. Over the last decade, employment shares have been steadily increasing up to 54 percent on average in 2024. This development since 2014 is comparable to the developments of the local labor markets in the Rhine-Ruhr and the Rhine-Main area (right panel). Figure 23 reports on the development of employment rates in the single member-regions of STRING.

One way to interpret the figures is in the light of the demographic developments described above. Despite an increasing population, the share of employed persons in the population increased, specifically over the last decade. This is in line with both an increasing immigration of labor and an increasing labor market participation of

STRING's inhabitants. The comparatively high employment rate in Hamburg (DE60) partially reflects the comparatively high share of the working-age population. Consistently, in 2024, employment rates were highest in Hamburg (DE60, 73 Percent), Hovedstaden (DK01, 61.5 Percent), and Oslo og Viken (NO08, 55 Percent). Only in Sydsverige (SE22, 47.9 Percent) and Sjælland (DK02, 42.2 Percent), less than half of the population is in employment. For the future development, sustaining a sufficiently high level of labor seems important.

Figure 23: Employment Rates—Regional Variation Within STRING



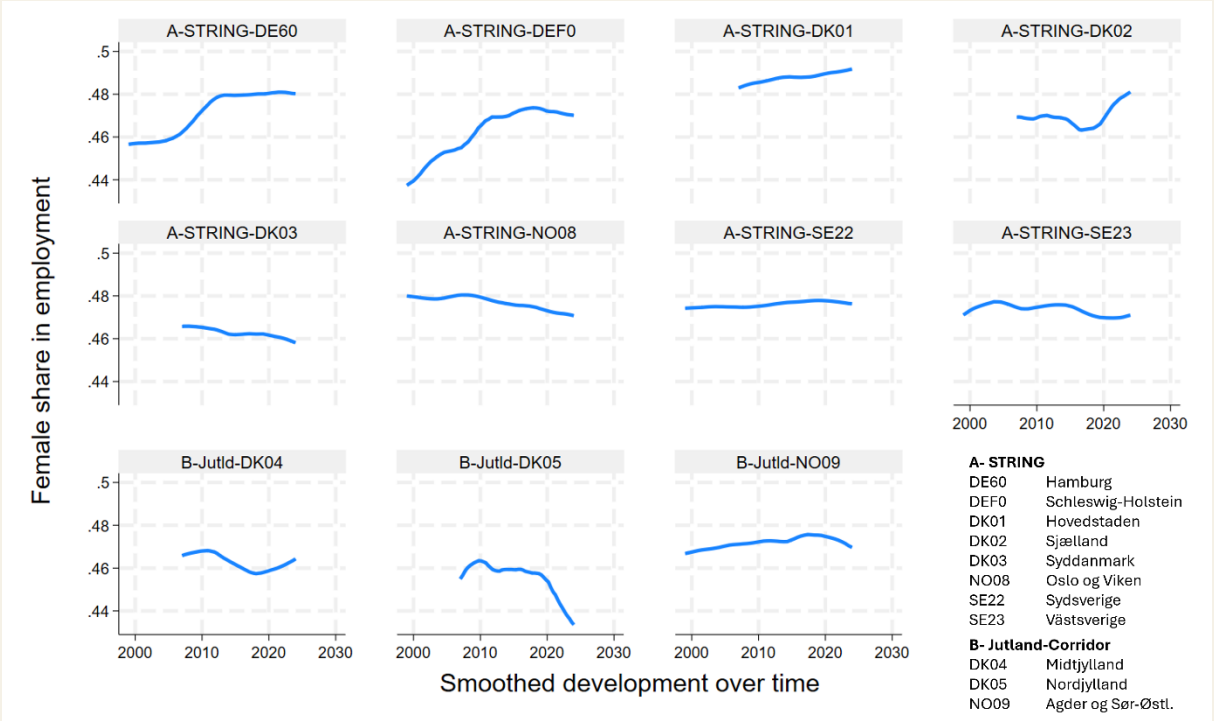
Notes: The figure shows smoothed time-series plots, reporting on the development of employment rates (the share of employed persons in the local population) in the NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

One way to dealing with the shrinking labor force is improving the labor market participation of women, and issue also contributing to gender equality and equal opportunities. Figure 24 reports on the development of the share of female employees in regional employment, for the STRING members and the adjacent regions of the Green Jutland Corridor.

Please note that the scale may exaggerate the dynamics observed in female labor market participation. On average, the female employment share slightly increased from 46 Percent in 1999 to 47 percent in 2024 in the STRING-region. Some members even saw a slight decline. The main message, however, is that the employment share of women never exceeded 50 percent, thus constantly staying below the female share in the population. Not only for gender justice, but also to better utilize the regional human capital, there seems to be room left for improving women's labor market access within STRING.

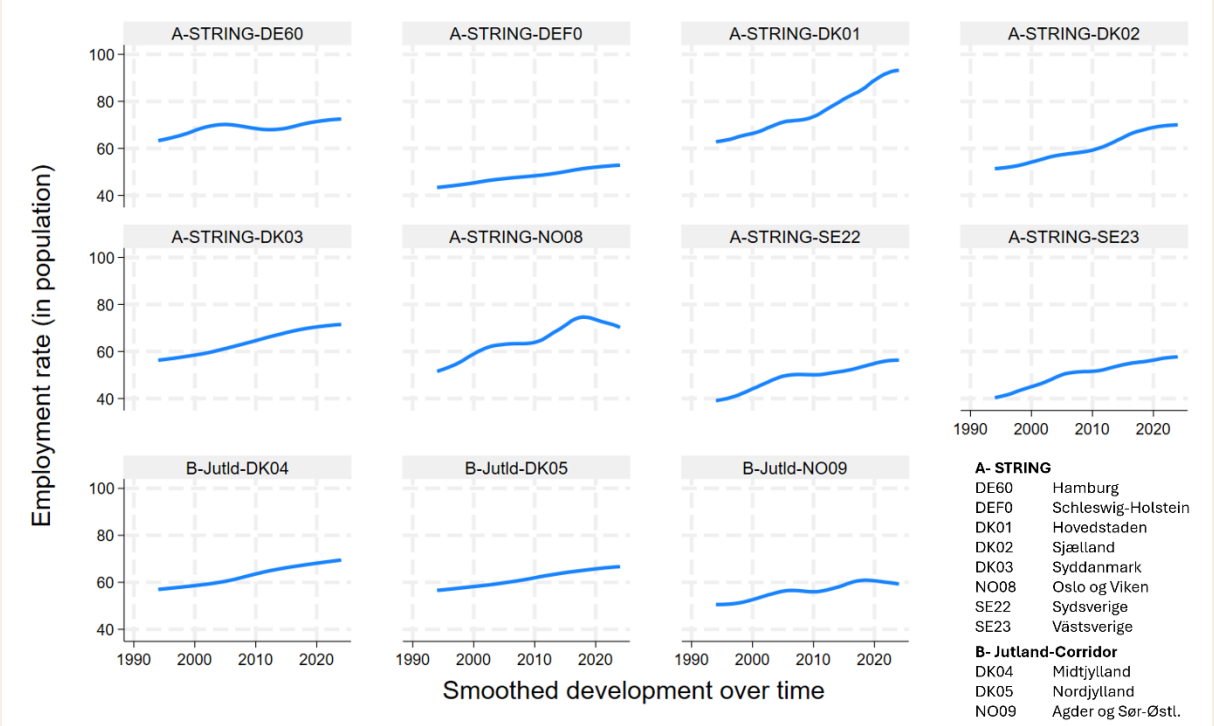
Apparently, labor in the STRING-region has not only increased in quantity, but also in quality, as Figure 25 suggests. It plots the development of labor productivity, measured as output per hour worked, over time.

Figure 24: Female Employment Share—Regional Variation Within STRING



Notes: The figure shows smoothed time-series plots, reporting on the development of the share of females in overall employment in the NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

Figure 25: Labor Productivity Per Hour—Regional Variation Within STRING

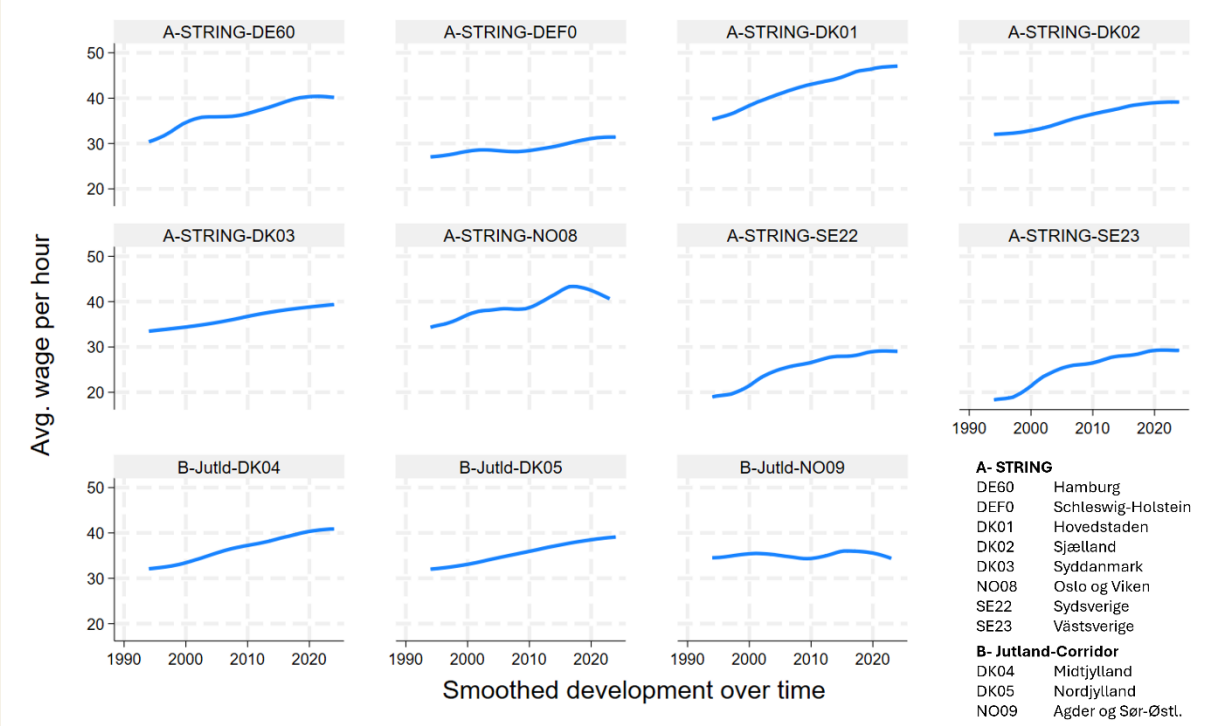


Notes: The figure shows smoothed time-series plots, reporting on the development of output per hour worked (labor productivity, in 2020 EUR) in the NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

The increasing labor productivity partially reflects the increase in high-skilled workers. In line with theory, productivity is comparatively high around the urban centers in Hovedstaden (DK01, 93.5 EUR/h), Hamburg (DE60, 71.37 EUR/h) and Oslo og Viken (NO08, 69.86 EUR/h). However, also the other Danish regions (DK03: 74.83 EUR/h; DK02: 73.35 EUR/h) are among the Top 3 in terms of labor productivity per hour (all values for the year 2024 and measured in 2020 EUR). Other members range between 52.81 (DEF0) and 58.24 (SE23). Again, the dynamics have been particularly pronounced for the Scandinavian members.

Consequently, wages have steadily increased, as Figure 26 confirms. It plots regional averages of hourly wages, measured in 2020 Euros, again for the years 1994–2024. As before, regions of the Green Jutland Corridor are reported for reference.

Figure 26: Hourly Wages (in 2020 EUR)—Regional Variation Within STRING

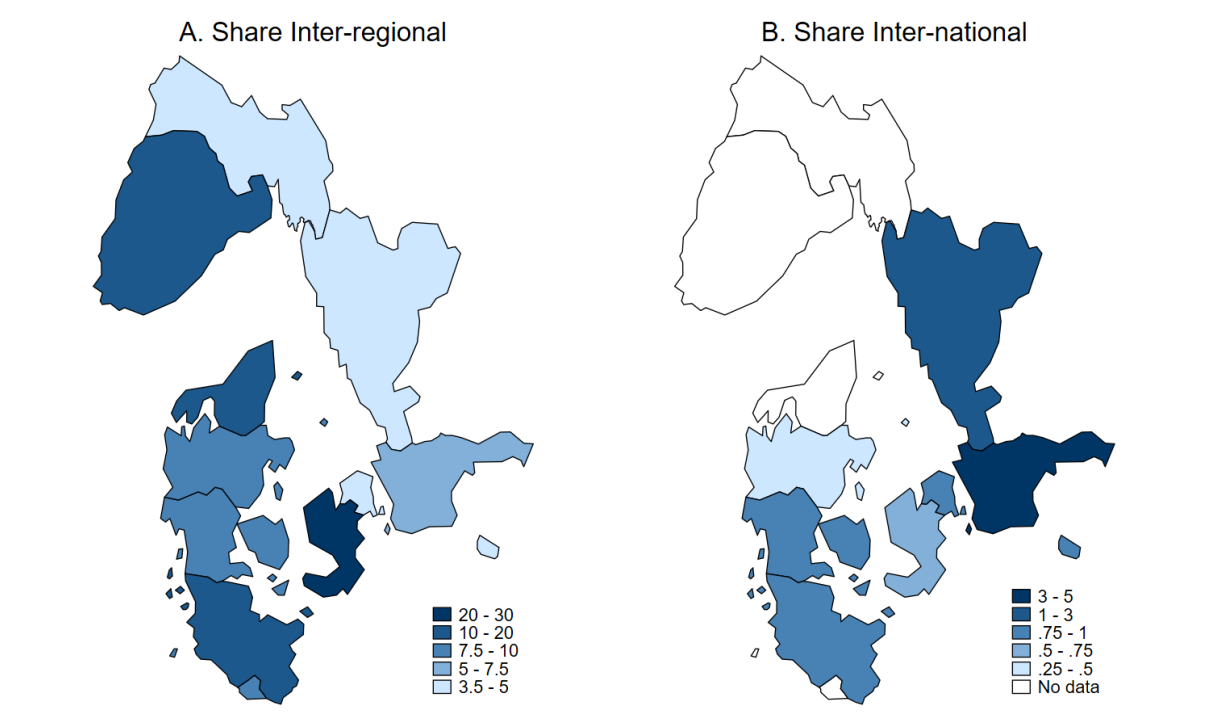


Notes: The figure shows smoothed time-series plots, reporting on the development of compensation per hour worked (regional average, in 2020 EUR) in the NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

Both the development of labor productivity and the regional level differences are reflected in the hourly wages paid within STRING. In 2024, labor compensation was highest in Hovedstaden (DK01, 49.1 EUR/h), followed by Syddanmark (DK03, 41.9 EUR/h) and Sjælland (DK02, 40.5 EUR/h). Hamburg (DE60) and Oslo og Viken (NO08) pay around 40 EUR per hour. Average wages in Schleswig-Holstein (DEF0, 31.8 EUR/h), Västsverige (SE23, 29.6 EUR/h) and Sydsverige (SE22, 29.4 EUR/h) are considerably lower. Partly, these wage differentials may be influenced by national labor market regulations. They also reflect regional specialization in more or less productive industries. Eventually, they also hint at labor markets within STRING being not yet perfectly integrated. If people could commute freely and without substantial costs within the region, wages should further converge.

Still, commuting plays a role within STRING, specifically around the agglomerations. Figure 27 maps the share of employed persons that commute to a different region (left panel) or to a different country (right panel) for work. Values refer to the most recent year observed, i.e., 2024.

Figure 27: Commuting Rates—STRING and Jutland Corridor



Notes: The figure shows the share of employed persons commuting to a different region (left panel) or to a foreign country (right panel) in 2024 on the NUTS2-level for the STRING region and the Green Jutland Corridor. Source: Eurostat/ARDECO, own illustration and calculations.

Commuting rates vary significantly between the STRING-members (left panel). Around 30 percent of the employees living in Sjælland work in a different region–most likely, in Copenhagen. Similarly, most of the 17 Percent of regional commuters from Schleswig-Holstein will probably work in Hamburg. Conversely, less than 5 Percent of the employees living in Hovedstaden or Oslo og Viken work in a different region. Overall, commuting rates have increased over the last years, though. However, despite freedom of movement, national boarders still represent a barrier to commuting. Some exception is Sydsverige, where 3.5 Percent of the employees work in a different country, most likely in greater Copenhagen. Another 5.4 Percent commute to a different region within Sweden. Although Västsverige lies in close proximity to two different foreign countries, international commuting rates are lower (1.1 Percent). Similarly, the close proximity between Syddanmark and Schleswig-Holstein does not lead to substantial international commuting. STRING's further integration into a Megaregion would imply an intensified integration of the local labor markets. Facilitating commuting could be one way to support this process. Specifically, cross-border commuting could be one way to mitigate disparities between the local labor markets.

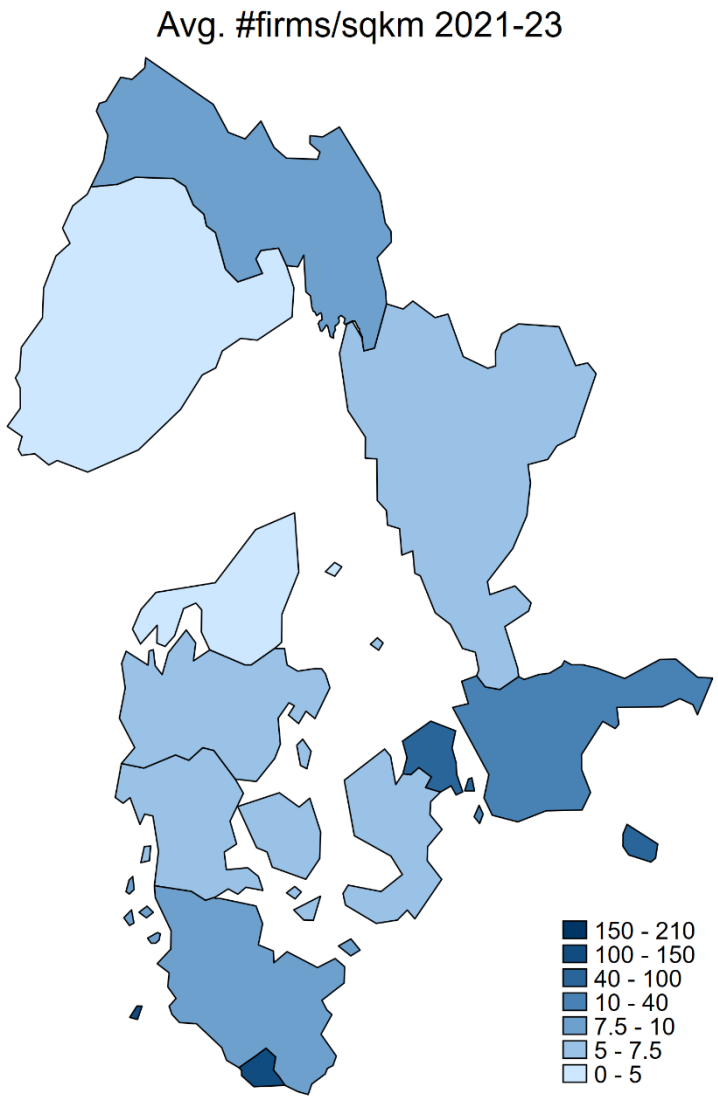
4.5 Business Structure and Dynamics

The STRING Business Landscape

Finally, we take a look at the demand side of labor. Of course, businesses do not matter as employers only. With their supply chains, they may themselves contribute to the economic integration of a region, if they cooperate with firms nearby. What is more, companies are drivers of innovation and thus growth, crucially affecting the development perspectives of their home regions. Table 5 lists the number of businesses located in STRING and the Green Jutland Corridor, as an average over the years 2021–2023.

Figure 28 depicts the corresponding business density. This is the number of firms per square kilometer.

Figure 28: Business Density—STRING and Green Jutland Corridor



Notes: The map shows the number of firms per square kilometer on the NUTS2-level for the STRING region and the Green Jutland Corridor. Mean values for the years 2021–2023 are reported. Source: Eurostat/AR-DECO, own illustration and calculations.

The map clearly shows how business activities are concentrated in the agglomerations. Hamburg hosts 145 firms per square kilometer. However, since it is also densely populated, it ranges in the middle-field when it comes to businesses per capita (c.f. Table 5). Per square kilometer, 49 firms are located in Hovedstaden. Sydsverige and Västsverige score high in terms of firms per inhabitant. Per square kilometer, they host 10 (Sydsverige) to 7 firms (Västsverige). Both Oslo og Viken and Schleswig-Holstein have 8 firms per square kilometer, but Oslo og Viken clearly has more firms per inhabitant. Altogether, the figures suggest that economic activities are centered around the major Scandinavian cities. In Northern Germany, Hamburg is an extraordinarily strong center of economic gravity. For comparison, Figure 29 depicts business density in other European megaregions, i.e, Randstad in the upper left, the Rhein-Ruhr area in the upper right, Rhine-Main in the lower left, and Milan in the lower right.

Table 5: Number of Businesses in STRING and the Green Jutland Corridor

	Region	# Businesses	per capita
A- STRING			
DE60	Hamburg	102648	0.056
DEF0	Schleswig-Holstein	128237	0.044
DK01	Hovedstaden	119250	0.064
DK02	Sjælland	45267	0.054
DK03	Syddanmark	62725	0.051
NO08	Oslo og Viken	190021	0.096
SE22	Sydsverige	147915	0.095
SE23	Västsverige	205155	0.098
B- Jutland-Corridor			
DK04	Midtjylland	72263	0.054
DK05	Nordjylland	30835	0.052
NO09	Agder og Sør-Østl.	65164	0.088

Notes: The table reports on the number of businesses located in the NUTS2-Regions contained in STRING (label A) or the Jutland Corridor (label B). Both absolute numbers and per capita values are reported. Averages are taken over the years 2021–2023. Source: Eurostat/ARDECO, own illustration and calculations.

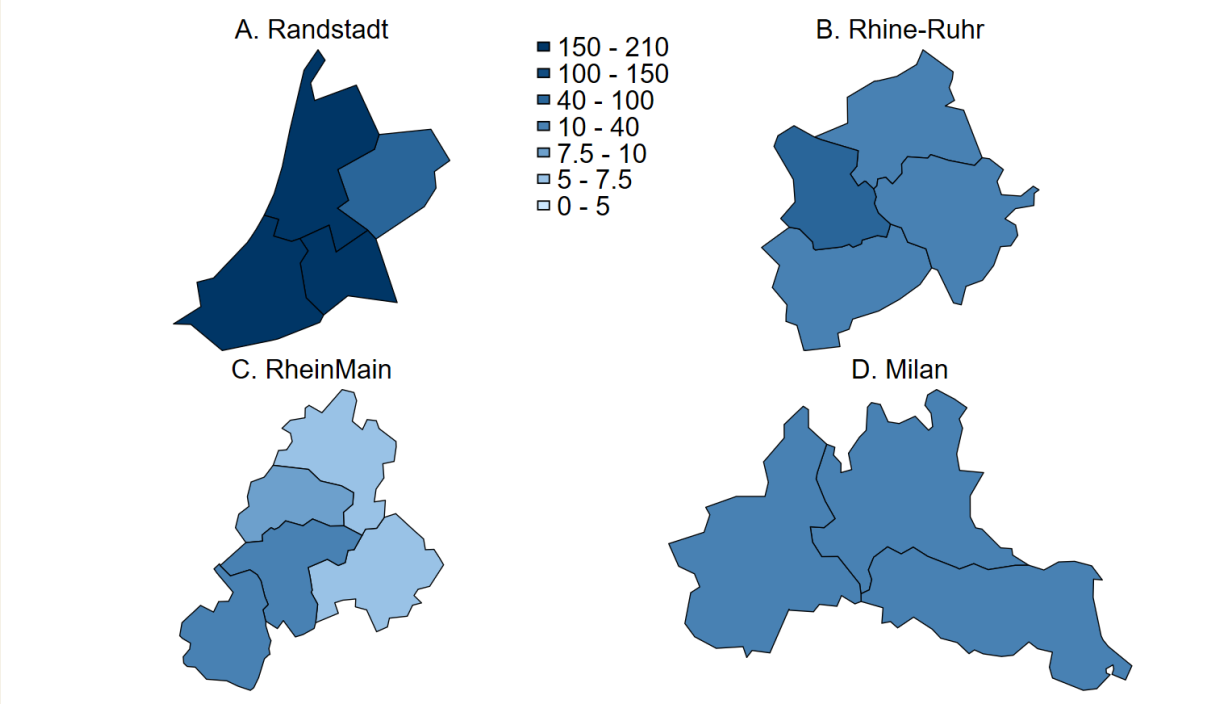
Innovation Indicators

STRING's economic perspectives crucially depend on STRING's companies' ability to innovate. Unfortunately, Eurostat's regional database does not provide information on innovation outputs for the regions and years of interest. What can be observed, though, are innovation inputs, specifically investments into research and development (R&D). Figure 30 plots regional investments into R&D (red bar), along with R&D-investments of the business sector (blue bar), all measured in Mio. EUR and averaged over the years 2021–2023, for the members of STRING and the regions of the Green Jutland Corridor.

The figure exposes significant heterogeneity in the volumes of research investments, along with pronounced differences in the involvement of the private sector. Hovedstaden (DK01) emerges as STRING's research hub, with investments of around 7.5 billion EUR, about two third of which are covered by the business sector. Interestingly, businesses invest almost the same amount into R&D in Västsverige. With investments of 4 respectively 3.4 billlion EUR, Hamburg and Oslo og Viken follow up, with

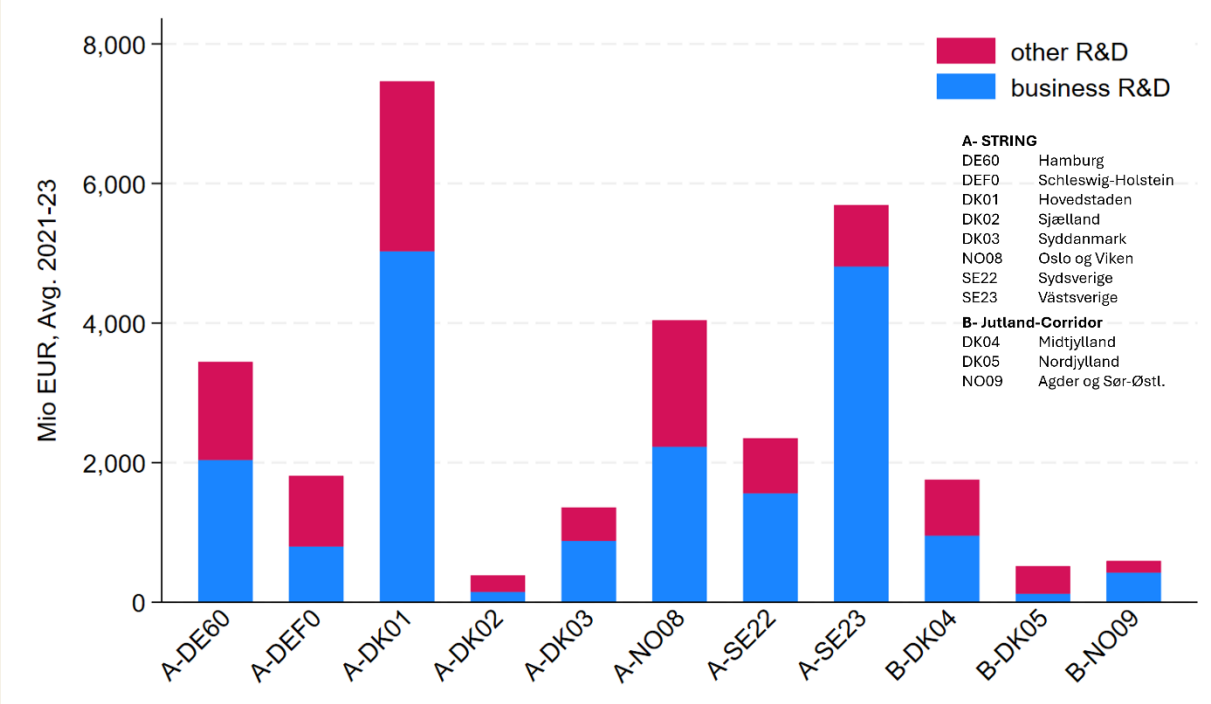
a business share between 59 (DE60) and 55 (NO08) Percent. Only in Schleswig-Holstein (DEF0) and Sjælland (DK02), the business sector contributes less than 50 Percent to the overall investments into R&D in the region.

Figure 29: Business Density—European Megaregions



Notes: The map shows the number of firms per square kilometer on the NUTS2-level for the Randstad region (upper left), Rhein-Ruhr (upper right), RheinMain (lower left), and Milan (lower right). Mean values for the years 2021–2023 are reported. Source: Eurostat/ARDECO, own illustration and calculations.

Figure 30: Regional Investments Into R&D—STRING and Green Jutland Corridor

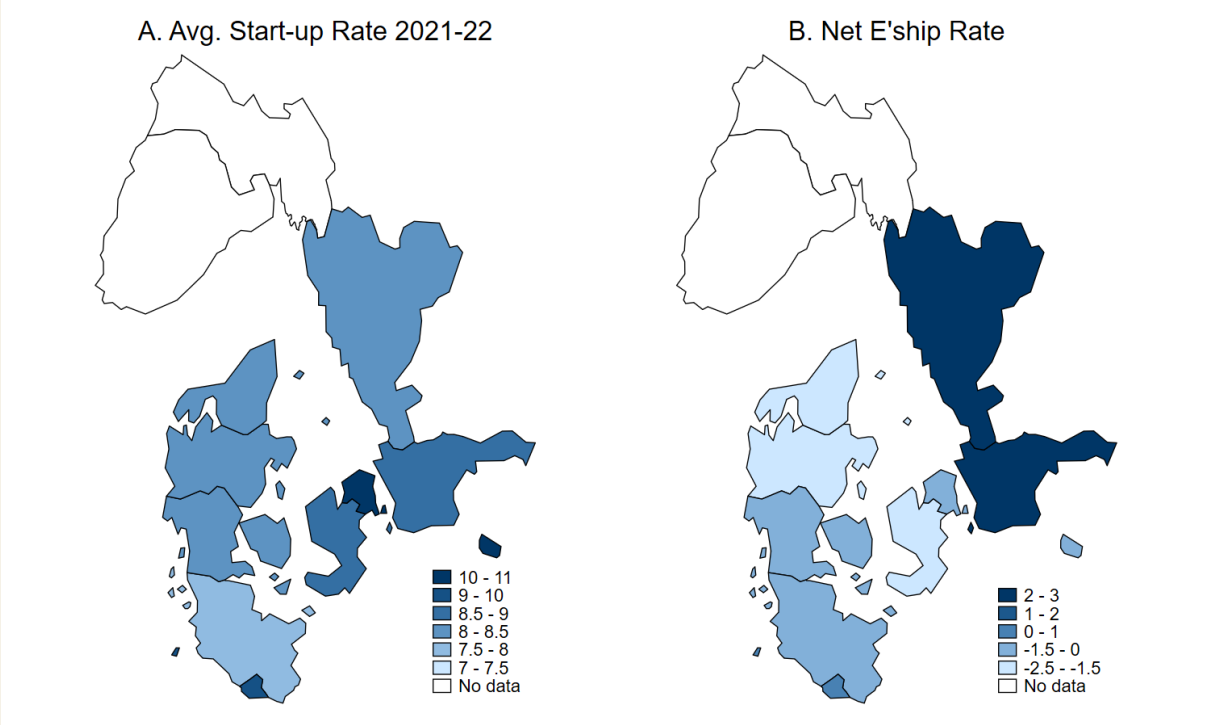


Notes: The graph shows bar plots indicating regional investments into research and development overall (red bar) and by the business sector (blue bar). Mean values in Mio. EUR for the years 2021–2023 are reported. Source: Eurostat/ARDECO, own illustration and calculations.

Another driver of innovation is entrepreneurship. Specifically, radical innovations are often introduced to the market by newly funded firms. Thus, Figure 31 reports start-up rates for the STRING-region and its neighbors. Averaged over the years 2021–2022, the left panel reports the relative number of newly funded businesses, relative to the number of existing firms. This is a measure of entrepreneurial dynamics. The right panel reports net entrepreneurship rates, i.e., market entries minus exits in relation to the number of incumbent firms. Positive numbers indicate a growing business population. Unfortunately, consistent data for Norway is not available.

Start-up rates are high in Hovedstaden and in Hamburg, as the left panel A of Figure 31 shows. Over the years 2021–2022, for every 100 existing firms, 10.4 (DK01) respectively 9.3 (DE60) new firms were founded. In vibrant entrepreneurial environments, high start-up rates often coincide with high exit-rates, implying intense business dynamics. This seems to be the case in Hovedstaden, where despite the highest start-up rate, the overall number of businesses decreased (left panel B). Apart from Hamburg, only the Swedish regions experienced a positive net entrepreneurship rate. Accounting for exits, around 2.7 new firms were added for every 100 existing firms.

Figure 31: Entrepreneurship Rates—STRING and Green Jutland Corridor



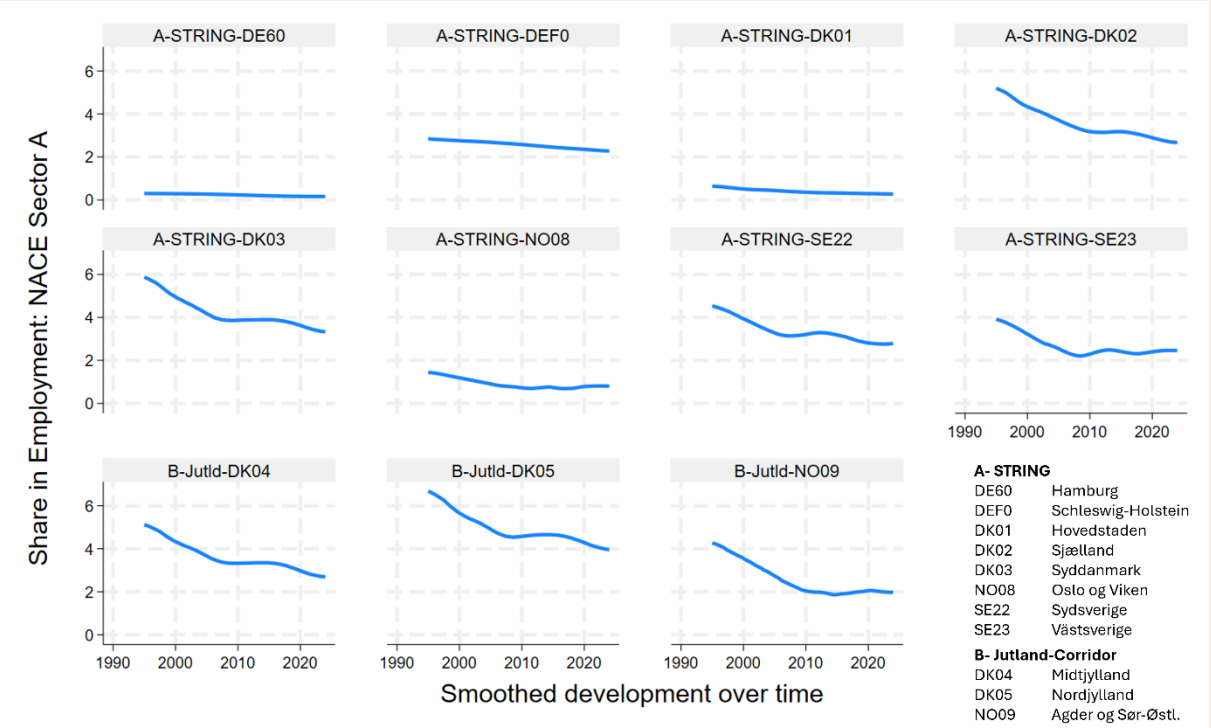
Notes: The map shows entrepreneurship rates on the NUTS2-level for the STRING region and the Green Jutland Corridor. Mean values for the years 2021–2022 are reported. The left panel shows start-up rates, i.e., market entries / existing firms. The right panel shows net entrepreneurship, i.e., (entries-exits) / existing firms. Source: Eurostat/ARDECO, own illustration and calculations.

Sectoral Dynamics

Entrepreneurship does not only contribute to innovation and growth, it is also a mediator in structural change. If old industries decline, start-ups may foster the creative part in creative destruction, helping new sectors to grow. The subsequent figures look more

closely into structural change in the STRING-region, by tracking the development of industry shares over time. Figure 32 starts with the share of agricultural employment (NACE Sector A) in a region's overall employment.[34]

Figure 32: Industry Share Agriculture—Regional Variation Within STRING



Notes: The figure shows smoothed time-series plots, reporting on the development of the share of agriculture (NACE Sector A) in overall employment in the NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

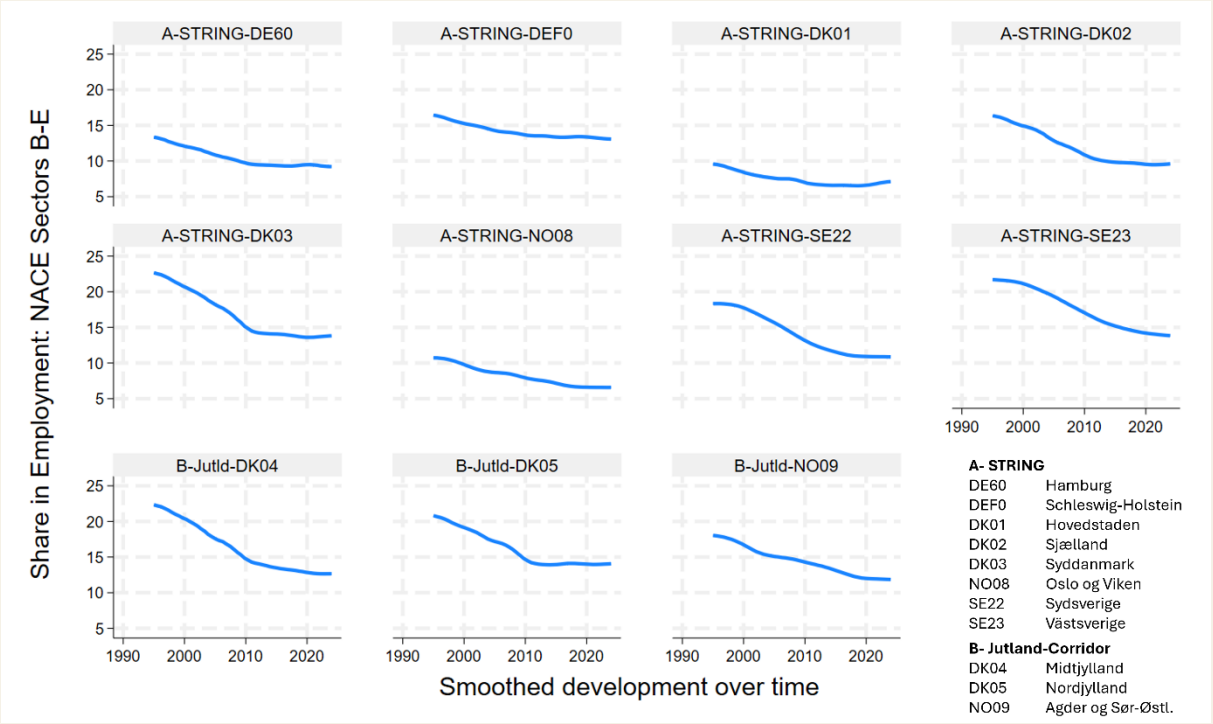
Starting at low levels, the share of agriculture in local employment has steadily declined. It plays no relevant role in Hamburg (DE60), Hovedstaden (DK01) and Oslo og Viken (NO08). For the other regions, the agricultural share in 2023 ranges between 2.3 and 3.3 percent of overall employment. Next is the share of manufacturing (NACE Sectors B–E), reported in Figure 33.[35]

Much in line with the European trend, manufacturing has significantly lost importance over time. Much in line with theory, it remains centered on the less agglomerated areas. Accordingly, despite similar trends, some members have retained a focus on manufacturing production. In Västsverige, Schleswig-Holstein and Syddanmark, the manufacturing share still lies between 13 and 14 Percent. Next, Figure 34 looks into the development of the Construction Sector (NACE Sector F).

[34] NACE (Nomenclature statistique des activités économiques dans la Communauté européenne) is the statistical classification of economic activities used by the EU. Employment Shares of NACE sectors indicate the industries' relevance for the local labor markets. Appendix Figures A.5-A.A.13 report on the industries' share in gross value added, indicating the relevance of the different sectors for local production.

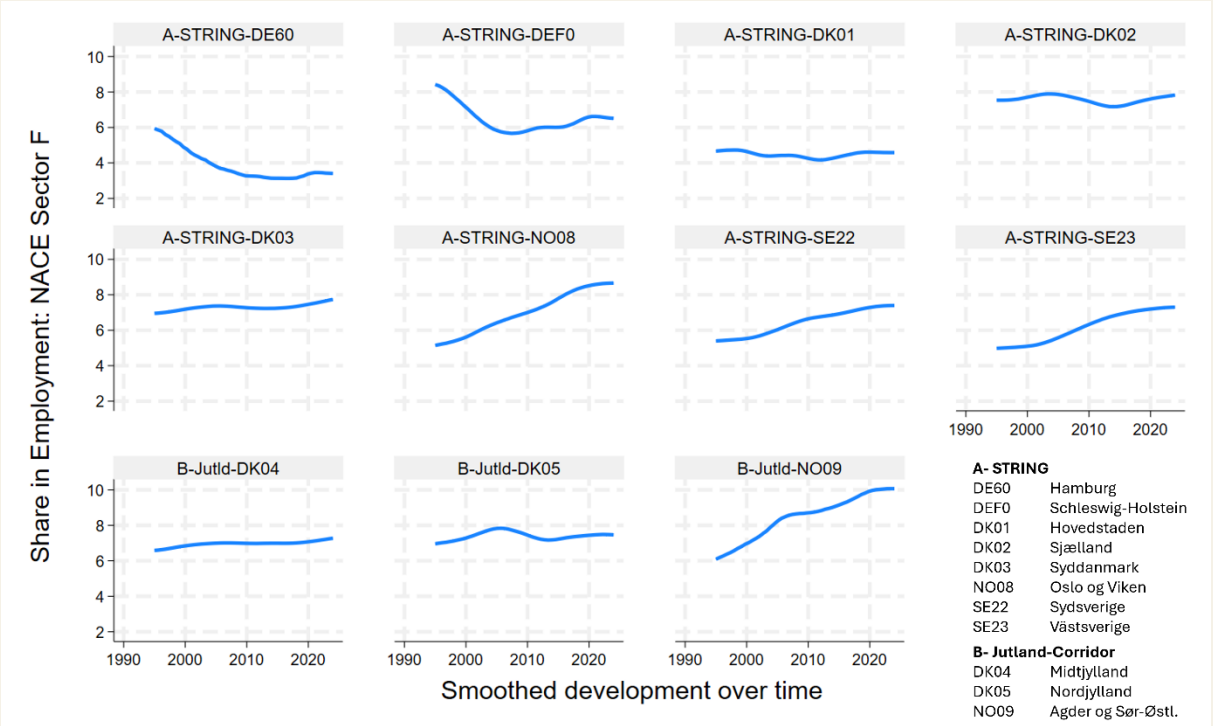
[35] NACE Sectors B-E are: Mining and Quarrying (B); Manufacturing (C); Electricity, Gas, Steam and Air Conditioning Supply (D); Water Supply, Sewerage, Waste Management and Remediation Activities (D).

Figure 33: Industry Share Manufacturing—Regional Variation Within STRING



Notes: The figure shows smoothed time-series plots, reporting on the development of the share of manufacturing (NACE Sectors B–E) in overall employment in the NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

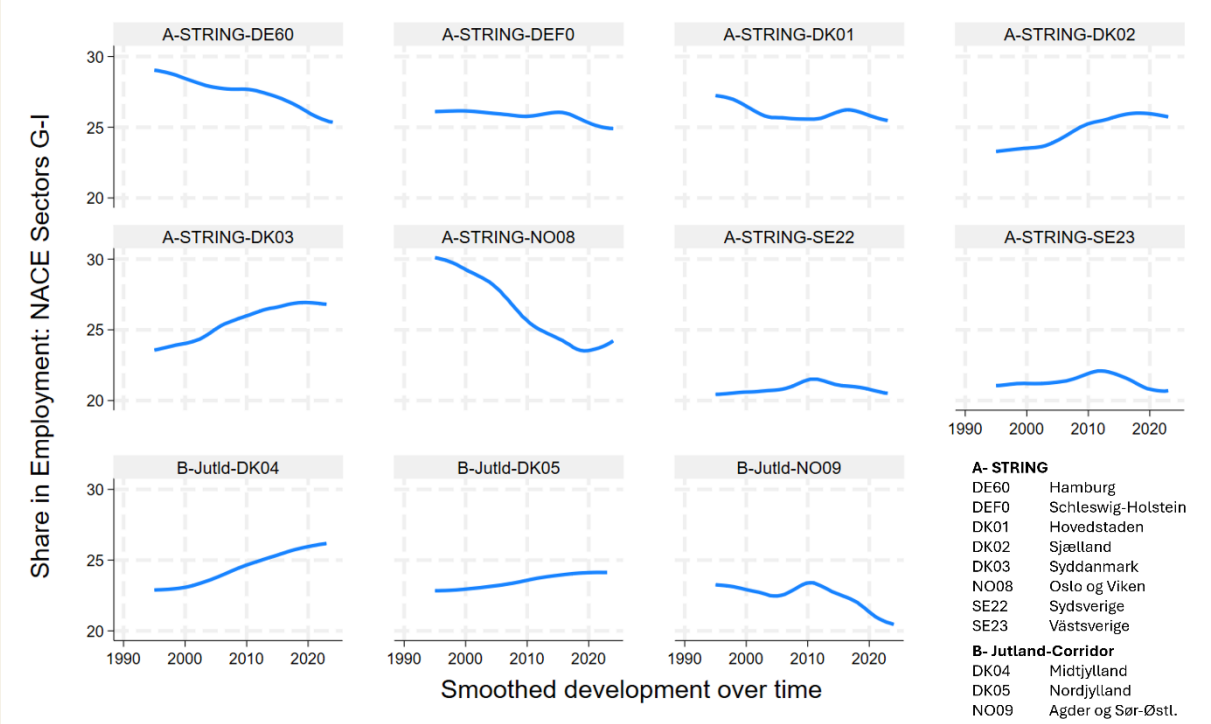
Figure 34: Industry Share Construction—Regional Variation Within STRING



Notes: The figure shows smoothed time-series plots, reporting on the development of the share of construction (NACE Sector F) in overall employment in the NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

The Construction Sector has developed quite differently between the STRING members. It increased in some but declined in other regions. For the most recent years, there is an upward slope in most regions. In 2023, the magnitude of the level differences was not too pronounced. With 3.4 (Hamburg, DE60) to 8.1 (Sjælland, DK02) Percent, the sector's relevance lies between agriculture and manufacturing. An exception is Oslo og Viken (NO08), where with 8.8 Percent, Construction is more important than Manufacturing, if employment shares are considered. The next Figure 35 reports on Trade and Transport, including the Hospitality sector (NACE Sectors G–I).[36]

Figure 35: Industry Share Trade & Transport—Regional Variation Within STRING



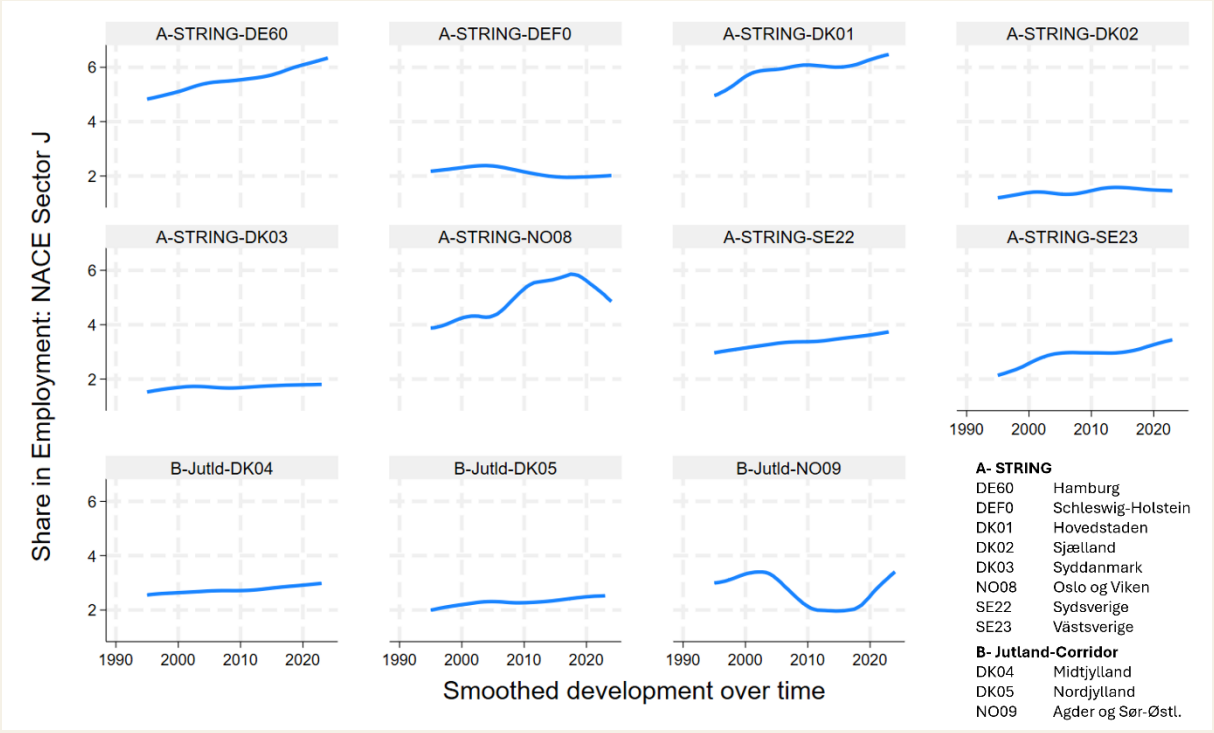
Notes: The figure shows smoothed time-series plots, reporting on the development of the share of Trade and Transport (NACE Sectors G-I) in overall employment in the NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

Figure 35 reports on Hamburg's most important–but declining–sector (as of 2023). For all other STRING members, this is the second-most important sector, with employment shares between 20 (SE22) and 26 Percent. The overall trends speak for some convergence between the STRING-regions in this specific area of economic activities. Next comes Information and Communication (ICT, NACE Sector J) in Figure 36.

In terms of employment levels, the ICT sector is of minor relevance. Still, it is regarded important since the broad NACE category J contains some particularly innovative and technologically advanced subsectors. Information and Communication has some (growing) relevance in Hamburg (DE69) and Hovedstaden (DK01). In Oslo og Viken, the sector has been declining since a couple of years. Conversely, the sector is on an upward trend in the Swedish regions. The next Figure 37 reports on Financial and Insurance Activities (NACE Sector K).

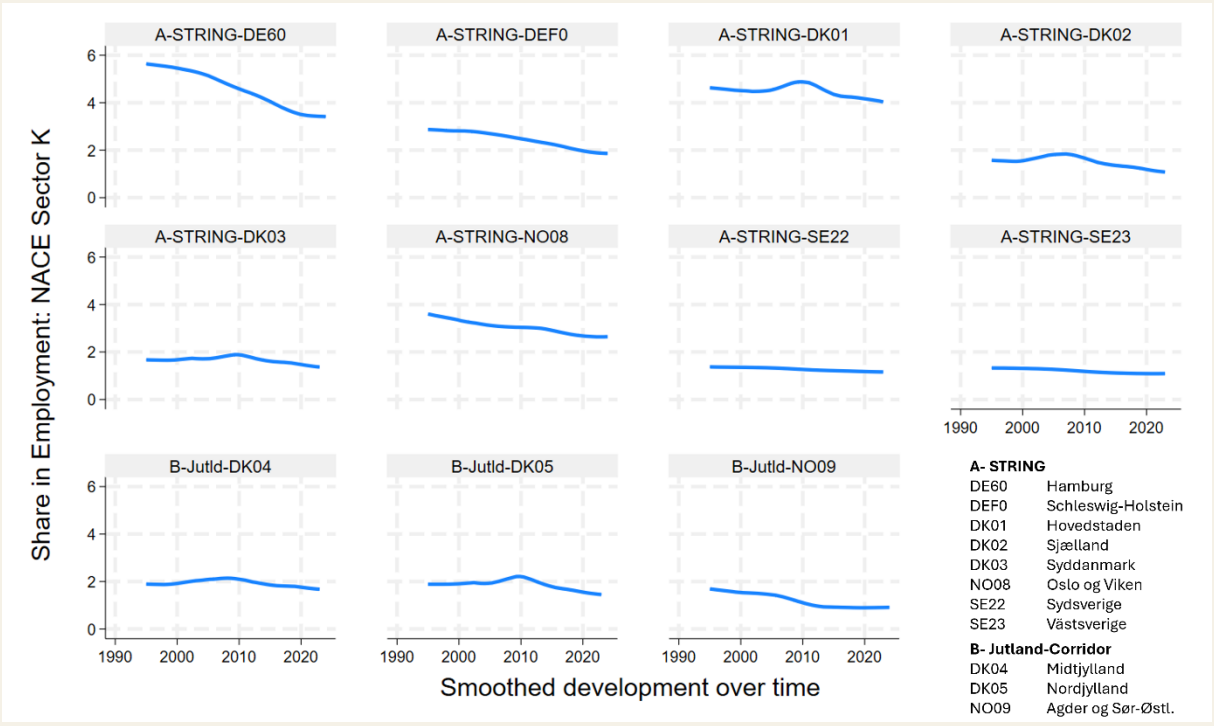
[36] NACE Sectors G–I are: Wholesale and Retail Trade, Repair of Motor Vehicles and Motorcycles (G); Transportation and Storage (H); Accommodation and Food Service Activities (I).

Figure 36: Industry Share ICT—Regional Variation Within STRING



Notes: The figure shows smoothed time-series plots, reporting on the development of the share of Information and Communication (ICT, NACE Sector J) in overall employment in the NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

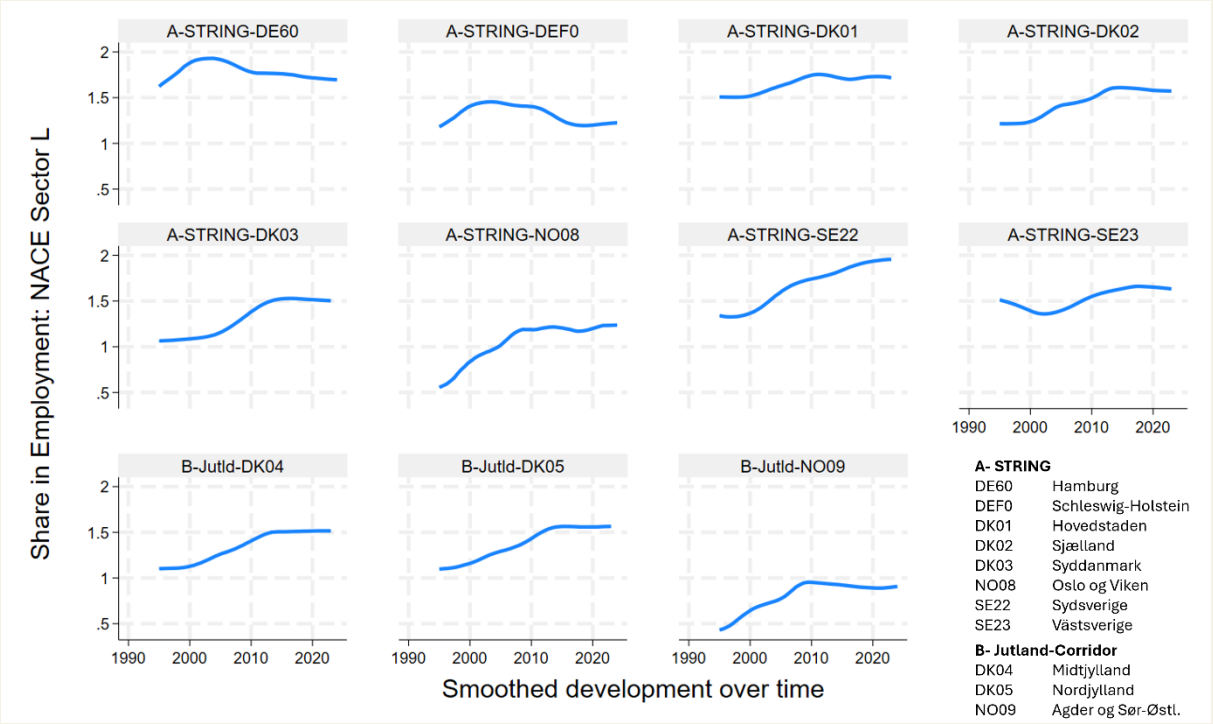
Figure 37: Industry Share Financial Services—Regional Variation Within STRING



Notes: The figure shows smoothed time-series plots, reporting on the development of the share of Financial and Insurance Activities (NACE Sector K) in overall employment in the NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

In general, employment shares are rather low in this sector. Overall, employment in financial services is declining in the STRING-region, for some members quite steeply so. In 2023, with around 4 Percent, this sector was largest in Hovedstaden, followed by Hamburg (3.4 Percent) and Oslo og Viken (2.7 Percent). For all other members, Financial Services ranges between 1.1 and 1.9 Percent of employment. Real Estate Activities (NACE Sector L) are next in Figure 38.

Figure 38: Industry Share Real Estate—Regional Variation Within STRING



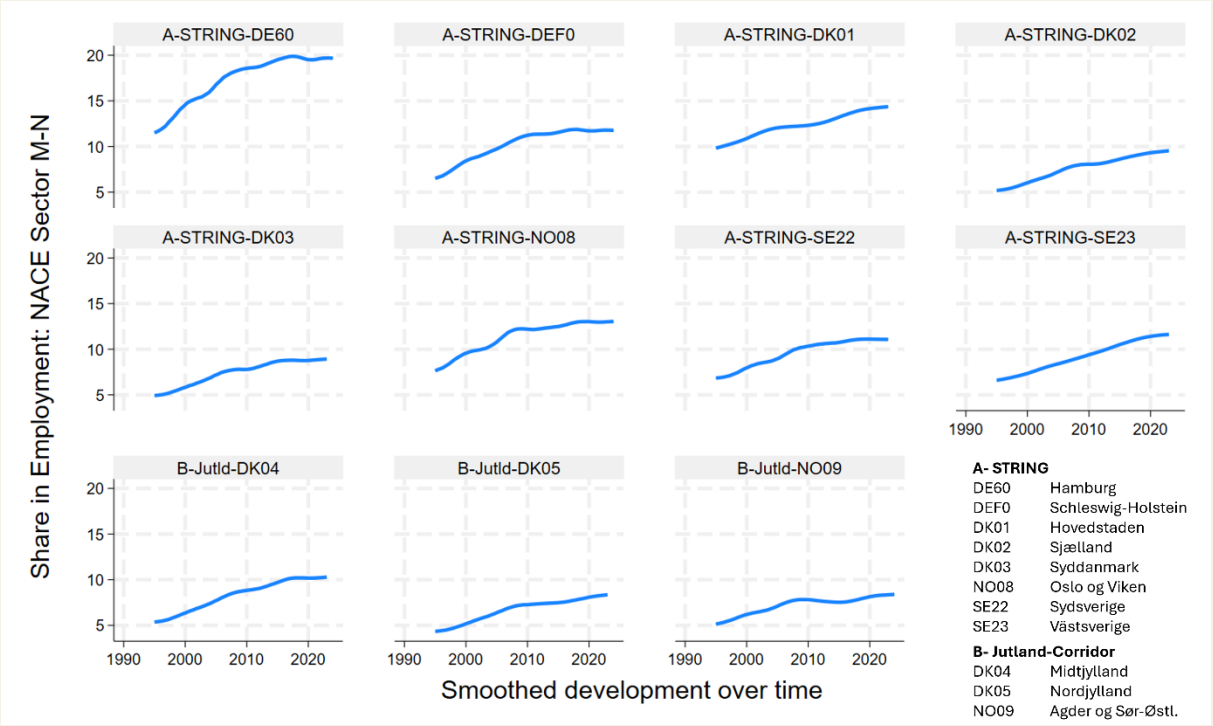
Notes: The figure shows smoothed time-series plots, reporting on the development of the share of Real Estate Activities (NACE Sector L) in overall employment in the NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

Real Estate Activities have gained ground in most but not all STRING regions. Overall, the employment share of this sector remains comparatively low, ranging between 1.2 Percent in Schleswig-Holstein and 1.9 Percent in Sydsverige. In the next Figure 39, the development of the Skilled Services Sector is reported (Nace Sectors M–N).[37]

The figure clearly shows the structural change towards services, specifically services that require high levels of education and training. As expected from theory, Skilled Services tend to center in the urban agglomerations. As of 2023, Hamburg (DE60) had the largest sector among the STRING members, with an employment share of 19.8 percent, followed by Hovedstaden (DK01, 14.6 Percent) and Oslo og Viken (NO08, 13 Percent). Only in the other Danish regions, less than 10 Percent of employment is in Skilled Services (DK02: 9.6 Percent; DK03: 8.9 Percent). The next Figure 40 looks into Public Services, including Education and Health (Nace Sectors O–Q).

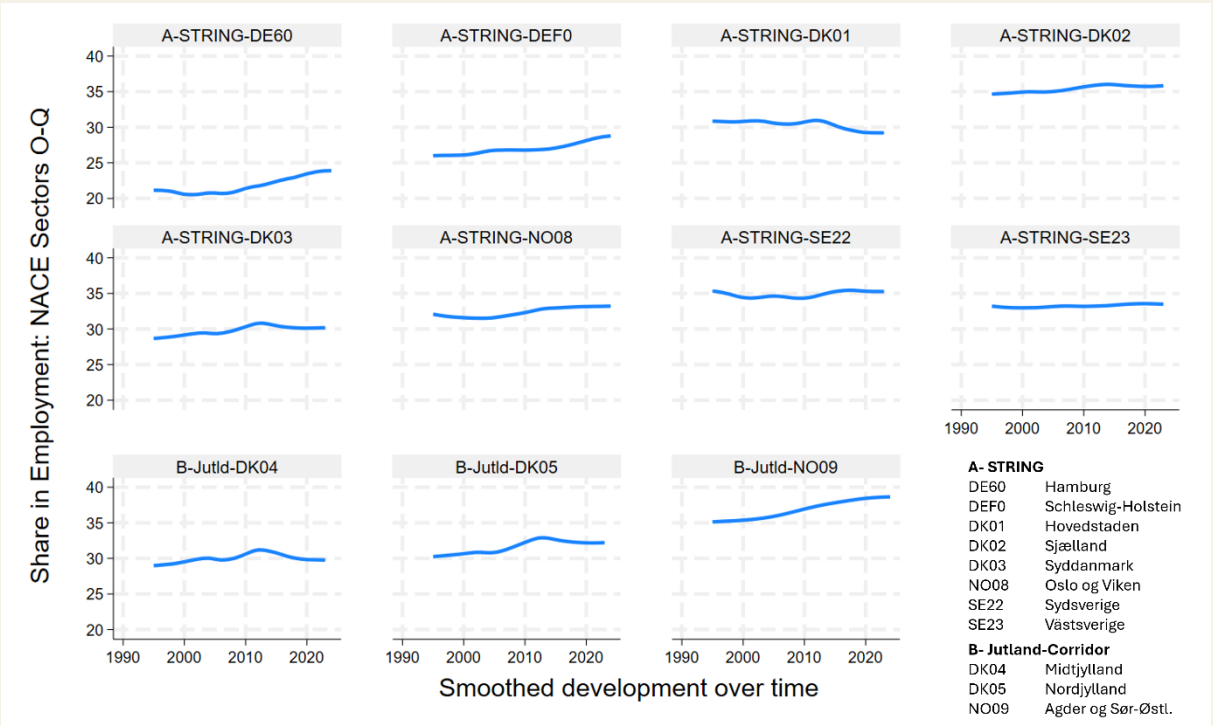
[37] NACE Sectors M–N are: Professional, scientific and technical activities (M); Administrative and support service activities (N).

Figure 39: Industry Share Skilled Services—Regional Variation Within STRING



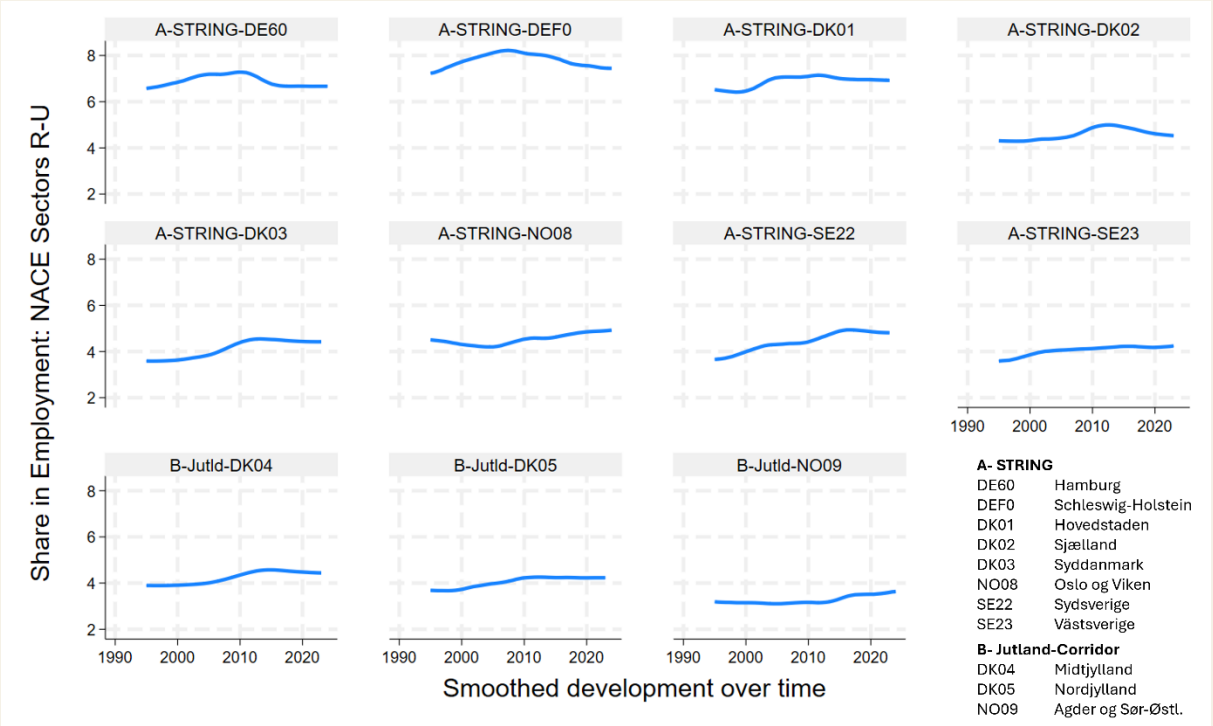
Notes: The figure shows smoothed time-series plots, reporting on the development of the share of Skilled Services (Nace Sectors M–N) in overall employment in the NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

Figure 40: Industry Share Public Services—Regional Variation Within STRING



Notes: The figure shows smoothed time-series plots, reporting on the development of the share of Public Services (Nace Sectors O–Q) in overall employment in the NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

Figure 41: Industry Share Entertainment and Household Services–Regional Variation Within STRING



Notes: The figure shows smoothed time-series plots, reporting on the development of the share of Entertainment and Household Services (Nace Sectors R–U) in overall employment in the NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

In terms of employment shares, Public Services (including Education and Health) are the most relevant sector in all STRING regions but Hamburg. The relevance of the sector is quite time-constant, broadly moving around 30 Percent, on average. In 2023, its share was highest in Sjælland (35.9 Percent) and Sydsverige (35.3) Percent. The lowest share of public services is observed for Hamburg (23.8 Percent). Finally, Figure 41 reports on Entertainment and Household Services (Nace Sectors R–U), i.e., the last sector remaining.[38]

One would expect this sector to be particularly relevant in densely populated areas but indeed, only in Schleswig-Holstein (DEF0), Entertainment and Household services account for more than 7 Percent of overall employment (7.4 Percent in 2023). Still, the sector is comparatively large in Hovedstaden (DK01; 6.9 Percent) and Hamburg (DE60; 6.7 Percent). For all other STRING members, the sectoral share ranges between 4.4 Percent (Västsverige, SE23) and 4.9 Percent (Oslo og Viken, NO08). The sector seems on a stable trend, adding to the "amenities" of the STRING-region that are seen as important factor in attracting creative minds.

For comparison, Appendix Figures A.5–A.13 show the development of industry shares in the regions' gross value added, i.e., their contribution to regional production. Particularly, the comparison shows that sometimes, decreasing labor shares may

[38] NACE Sectors R–U are: Arts, entertainment and recreation (R); Other service activities (S); Activities of households as employers (T); Activities of extraterritorial organizations and bodies (U).

correspond to increasing productivity, i.e., an increasing share in a region's GVA–and vice versa. The implications of similarities and differences in the regional industry structures will be intensively discussed in the next Section 5.

5 Fields for Cooperation in the STRING Region

5.1 Lessons From Global and European Megaregions

When looking for suitable benchmarks for the further development of STRING, it must be taken into account that the character of STRING has changed over time. From a top-down lobby organization for an infrastructure corridor, STRING has developed into a bottom-up cooperation of regions that want to achieve greater competitiveness and higher growth dynamics together. As already discussed, this requires the formation of "critical masses" while enabling a balance of interests among the members. In order to achieve critical masses, STRING has so far focused on developing a sustainable transport infrastructure, creating a "green hub," and establishing a sustainable and inclusive megaregion.

However, the enlargements up to date have increased the heterogeneity of STRING, making it more difficult to find common ground. The establishment of a joint megaregion requires that infrastructure projects should be regionally balanced, that STRING's sectoral specialization pattern should reflect the comparative advantages of all members, and that there should be a willingness to relinquish regional and national regulatory powers in favor of the megaregion. In order to achieve broad identification with STRING and its goals, the advantages of STRING must serve all participants, balancing their specific regional interests. Against this background, a closer look at institutional structures of the polycentric megaregions presented in Section 3 may provide some valuable insights for the development of STRING.

1. Guangdong-Hong Kong-Macao Greater Bay Area (GBA): In the GBA, the top-down approach dominates due to strong central power. Balancing regional interests or incorporating regional expertise have no priority. Rather, a development path is prescribed that limits the scope of action of the member regions. Although the costs of reaching consensus are low and implementation times are short, regional integration does not follow the principle of subsidiarity, which makes costly inefficiencies more likely. This authoritarian approach with a central actor is contrary to the institutional reality of the STRING region, which limits GBA's potential of serving as role model for STRING.
2. San Francisco Bay Area: The institutional development of the Bay Area is significantly more advanced than that of STRING. Despite decentralized decision-making structures, there are institutions that perform sovereign administrative and planning tasks, as well as interest groups that participate in shaping the Bay Area, and represent their members in the megaregion. A broad network of authorities, municipalities, and businesses has emerged to balance interests in the Bay Area. This decentralized approach and the broad anchoring of this megaregion therefore may provide some guidance for STRING, where identification and participation are less pronounced, the intensity of cooperation is lower, and competences are more fragmented. Specifically, the inclusion of

existing networks of private actors, as well as concrete projects like the development of a (mega-)regional public transport system, may serve as benchmarks.

3. The Randstad: In Europe, the "Randstad" is considered a model for a polycentric megaregion. Indeed, the empirical analysis above reveals some similarities with STRING. However, it is evident that dedicated governance structures do not necessarily have to develop in a highly densified and interconnected economic area. In the case of the "Randstad", the institutional structure of the Netherlands alone speaks against this. Nevertheless, it is also clear that, due to very similar development goals and regional overlaps, such as in infrastructure, joint coordination and representation of interests is desirable for the metropolitan subregions in the "Randstad". This concerns issues such as connected transport routes, international competitiveness, and lobbying activities at EU institutions. Thus, a less deep institutional structure of a megaregion is also compatible with the principle of subsidiarity–here, there are parallels to the STRING region. Of specific interest is the flexibility of the institutional structure, that allows for joint activities between the Metropolitan Regions of Amsterdam, Rotterdam The Hague, and Utrecht, while preserving the autonomy of the three partners. Particularly, this might guide the cooperation of STRING with other regional entities.

4. Rhine-Ruhr: As with the "Randstad", the "Rhine-Ruhr" megaregion is a polycentric agglomeration with high connectivity that is not linked to an institutional framework for the entire region. Despite a large functional economic area, two metropolitan regions have historically evolved into "Rhine-Ruhr," each with its own institutions. The depth of institutional integration in the sub-regions differs significantly. Nevertheless, cooperation between the sub-regions is considered useful, as "Rhine-Ruhr" is also concerned with international visibility in the competition between European metropolitan regions. Unlike the "Randstad", however, there is no common umbrella organization. Rhine-Ruhr only coordinates the sub-regions in representing their interests within the circle of European metropolitan regions. Accordingly, the organizational structures are less developed as in STRING. However, Rhine-Ruhr shows that, in principle, a megaregion can consist of sub-regions with varying degrees of integration and can do without an institutional roof of its own.

5. FrankfurtRhineMain: The FrankfurtRhineMain metropolitan region also has a polycentric structure spread across three federal states. Unlike "RhineRuhr", "FrankfurtRhineMain" does not have sub-regions with different levels of integration, but rather a deeply integrated regional core with a less integrated "periphery." Despite administrative fragmentation and competition within the metropolitan region, there is a common umbrella organization, as cooperation is intended to increase the international visibility and competitiveness of the entire region. To this end, there is an office that acts as a coordinator and platform for the entire metropolitan region, and a EU office that represents its interests in Brussels. In addition, there are private initiatives from the business community that also contribute to the visibility of the "FrankfurtRhineMain" metropolitan region. This

means that the common institutional framework is larger than in "RhineRuhr" and the involvement in shaping the megaregion is also broader. Overall, "FrankfurtRhineMain" shows that a megaregion can have different speeds of integration. While it does not transcend national boundaries, it still has to cope with different regulatory frameworks defined on the state-level, which may provide some insights for STRING.

Moreover, there are lessons to be learned from the stalled development of "Western Scandinavia" into a megaregion. One is that you cannot form a megaregion from scratch. It needs an economic core, formed by agglomeration dynamics that evolve naturally. However, the example of "Western Scandinavia" also points out the relevance of establishing institutional structures, identifying areas for cooperation in the joint interest of all members, formulating concrete projects for cooperation, developing an umbrella brand, mitigating the impacts of national borders (and interests), and utilizing existing networks (see Chapter 3.4).

Beyond learning from other megaregions, blueprints for the institutional structure of STRING can also be found in various cross-border cooperation initiatives in the EU, particularly in the Euregios. For example, the Euregio Meuse-Rhine and the Grande Region have used the legal form of the "European Grouping for Territorial Cooperation" (EGTC) to perform joint tasks (see Box 1 in Appendix D.1). As a cross-border association, the EGTC has a stronger position vis-à-vis national institutions and thus greater scope for action, even if it has no sovereign powers. The EGTC of the "Euregio Meuse-Rhine" acts as the central point of contact, information gathering point, and communicator, as well as initiator and coordinator of projects. The EGTC brings together the relevant actors in the border region and supports them in the implementation of projects. In the "Grande Region," the ETC was also used to outsource administrative tasks and thereby pool competencies.

Based on the experiences of the Euregio Meuse-Rhine and the Grande Region with the EGTC, the following advantages arise in particular: (1) A legal basis for cooperation under EU law is created, accompanied by stronger legal personality. This facilitates cross-border cooperation and increases the political weight of the joint institution. (2) Existing community bodies are upgraded and their work is improved through greater autonomy. (3) The powers of the EGTC can be designed flexibly so that it could also be entrusted with the independent implementation of projects. (4) Access to sources of financing and EU funding is facilitated. (5) A more democratic structure is created, leading to greater transparency and efficiency.

However, the formation of a EGTC requires the willingness of the members to transfer own powers to the EGTC.[39] In summary, it can be said that there is no uniform pattern for the institutional integration of megaregions. In this respect, no single blueprint for the STRING region can be derived from the wide range of forms of cooperation. However, the benchmark regions show a spectrum of possibilities that offer options for

[39] See in detail Bille et al. (2022: 73-78).

action for the further development of STRING. This is not only an institutional question, though. At the core is the question of economic complementarities and joint growth perspectives, stemming from agglomeration advantages. Neither is this a purely economic question. STRING's ambition to build a green, sustainable and resilient megaregion goes beyond just facilitating economic exchange to better exploit regional economies of scale. The degree to which STRING may integrate beyond economics must be a political decision. The view on other megaregions exemplifies that different degrees of integration are possible–and feasible.

5.2 Potential for Economic Integration

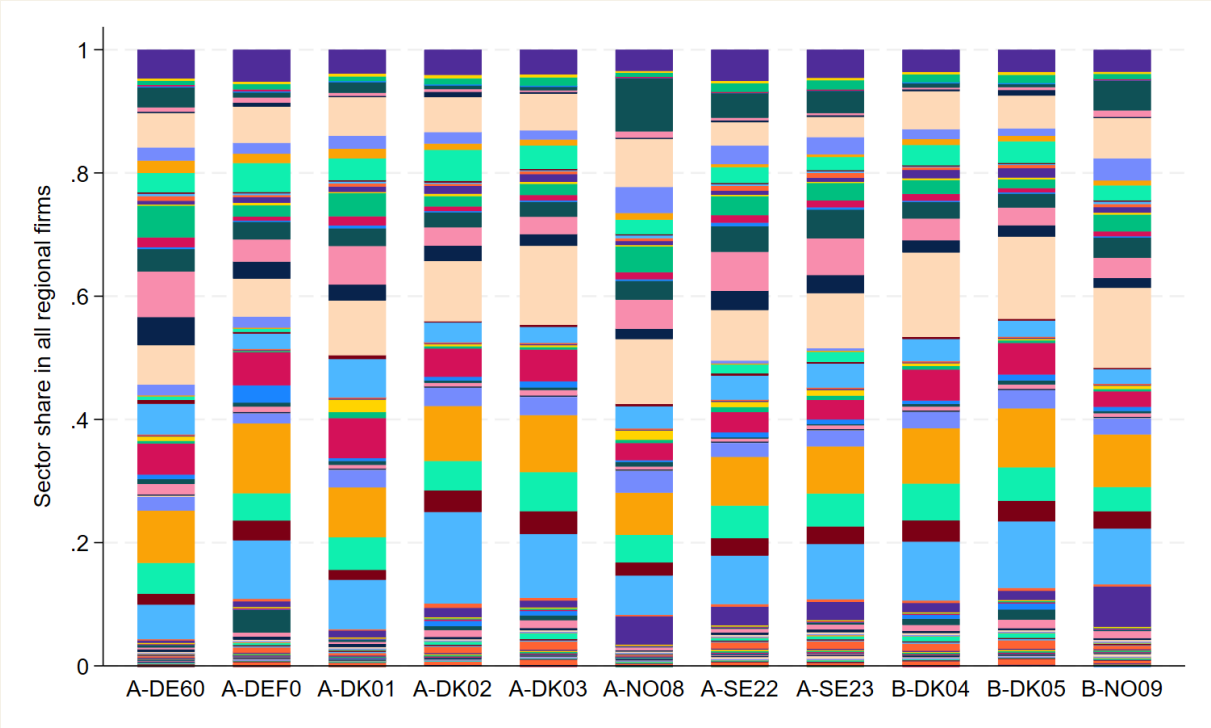
From the business side, regional exchange follows value chains. Firms in one region provide inputs for production in other regions. Thus, potential for intensifying economic integration depends on similarities in the industrial composition, since firms within the same sector are more likely to establish buyer-supplier linkages. Equally important are complementarities in regions' industry structure. For instance, business services in one region will benefit from the close proximity just of companies, largely independent of these companies' industry affiliation. Eventually, agglomeration forces play a role. Even if firms within the same sector do not cooperate but compete between regions, this may foster integration. The reason is that in combination, both regions gain importance for outside investors, suppliers, or workforce.

Similarities in Regional Industry Structures

Accordingly, to infer on prospects for furthering the economic integration of the STRING-region, Figure 42 more closely looks into similarities in the industry structure. The underlying data stem from the Structural Business Statistics (SBS). Thus, the primary sector and the public sector are excluded. Moreover, for reasons of data availability, all values are averaged over the years 2021–2023. SBS date report on firms' industry affiliation on the level of 2-digit NACE-categories. For each region, Figure 42 shows the share of firms in a specific NACE-category in the population of firms (covered by the SBS). A detailed legend, together with a list of 2-digit NACE-categories, can be found in Appendix B.1.

To gain some orientation, let's look at A-NO08 in the middle of the graph, reporting on Oslo og Viken. The small bars at the bottom indicate activities in mining and quarrying (categories B), manufacturing (categories C), electricity, gas, steam and air conditioning supply (categories D) and water supply, sewerage, waste management and remediation activities (categories E). Although firms in these sectors are small in numbers, they may be comparatively big—we will account for that in the subsequent Figures. Coming back to NO08, the construction sector starts with the purple bar at the bottom (category F41, construction of buildings) followed by civil engineering (F42, narrow orange bar) and a blue bar, indicating specialized construction activities (F43). Quite a

Figure 42: Similarities in Industry Structure—STRING and Green Jutland Corridor



Notes: The figure shows stacked bar charts, reporting on industry structure in the NUTS-2-regions belonging to STRING (label A) or the Green Jutland Corridor. Each colored block refers to the share of firms observed in a NACE-2-digit industries in the population of firms located in a region. Source: Eurostat/ARDECO, own illustration and calculations.

few firms are active in this "blue sector" F43 at the bottom throughout the regions. With the brown bar on top, wholesale and retail trade (and repair of motor vehicles and motorcycles) begins, ranging over the green bar on top of brown to orange. Above comes transportation and storage, ranging from lavender to a dark green bar just below blue and red. Blue and red indicate accommodation (I55) and food and beverage (I56) services. What follows are information and communication services around a yellow and a blue bar. Right below the middle of the NO08 graph, there are a couple of small bars for financial and insurance activities (categories K). The apricot bar in the middle of NO08 reports on real estate activities (L68). With the dark blue bar above, professional, scientific and technical activities start (categories M), ranging over dark green, blue, and crimson to yellow. Around the 70 percent line, there is a small purple bar, defining the start of administrative and support service activities (categories N). They range up to an orange bar, just above mint. On top, lilac reports on the education sector (P85). Starting with a beige bar on top, human health and social work activities start (categories Q). The bar in dark green around the 90 percent line marks the beginning of arts, entertainment and recreation activities (Sectors R). Eventually, the yellow and purple bar on the very top report on other service activities.

For a first overview, let's look at similarities in the regions' industry structures. Subsequently, we will investigate whether these patterns hold once we take into account differences in firm sizes, and zoom into single sectors. What stands out is the similarity in the sectoral structure of the business population between Sydsverige (SE22) and Västsverige (SE23). Both regions host a small set of firms diversified in the different

sectors of manufacturing and related sectors. Construction plays a role, but more than 80 Percent of the firms operate in service industries. Let's call both regions SE-A. Likewise, Sjælland DK02 and Syddanmark DK03 closely resemble each other. Let's call them DK-A. There is a strong overlap in the business structure between DK-A and SE-A. However, one also sees some differences. In DK-A, more firms are active in the manufacturing sectors (Categories B and C). Moreover, in DK-A, specialized construction activities are more important and construction of buildings. In SE-A, more firms are active in professional, scientific and technical activities, as well as in creative, arts and entertainment activities. Conversely, human health activities play a bigger role in DK-A. We will examine such differences more closely. Right now, we are only interested in the overall patterns, comparing internal divisions of the bars between regions.

Quite similar to the business structure in DK-A is the business structure in DEF0, i.e., Schleswig-Holstein. Specifically, north of the 60 percent line, i.e. in sectors of categories M-S, the regions closely resemble each other.[40] More differences exist in the Sectors H-L between the 40 and the 60 percent line. Also, the pattern at the bottom, representing manufacturing and related industries, is less similar.

As expected, the manufacturing sectors at the lower end of the bars is smaller in the agglomerations around Hamburg (DE60), Copenhagen (DK01), and Oslo (NO08). Indeed, the business structure differs quite a bit in comparison with DEF0, DK-A, and SE-A, reflecting a stronger concentration of knowledge-intensive production in the urban centers. More interesting are the differences between the agglomerations. Clearly, DE60, DK01 and NO08 have specialized in different parts of the value chain, with Hamburg appearing to be most diversified.

The picture changes a bit when weighting the regional industry structure with employment. Figure 42 above gives equal weight to any firm, independent of its size. Figure 43 below reports on employment shares instead, accounting for the size of the different sectors in relation to a region's overall employment. In comparison, Figure 42 gives an impression of growth potentials, since small firms may grow in the future. Figure 43 is more informative regarding current specialization patterns. A detailed legend, together with a list of 2-digit NACE-categories, can be found in Appendix B.1.[41]

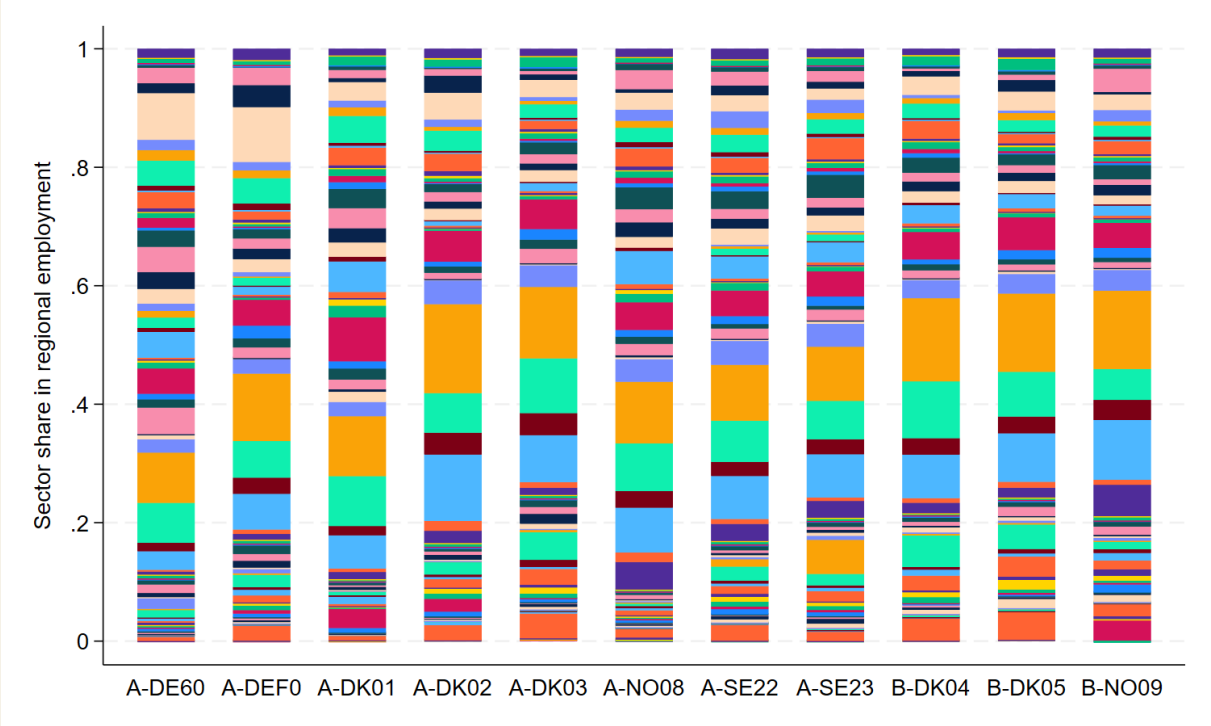
Still, we are interested in overall similarity patterns. A more detailed analysis of different subsectors will follow. Let's start with looking at SE22 and SE23 again, i.e., our previous SE-A. When accounting for the size of the sectors, similarities within SE-A diminish. Specifically, in the manufacturing sectors depicted at the lower end of the bar, both regions show different specialization patterns. One reason for the differences between Figure 42 and Figure 43 may be buyer-supplier relationships, i.e., larger companies in one region buying intermediate inputs from smaller firms in the other region. Interestingly, when accounting for the size of the sectors, NO08 becomes quite similar to SE-A. Comparing just the bar for NO08 between Figure 42 and Figure 43 indicates

[40] See Appendix B.1 for a detailed list of NACE codes and sectors.

[41] Please note that employment shares in the SBS-data deviate from employment-shares reported in Section 4.5, since NACE-categories A, O, and Q are not observed (and thus do not enter the denominator).

that some sectors (with broader bars in the previous Figure 42) are dominated by small firms, and the NO08 hosts some larger firms (with broader bars in Figure 43) in other sectors. Accounting for the size of the sectors, all three regions appear quite diversified.

Figure 43: Similarities in Employment-Weighted Industry Structure—STRING and Jutland Corridor



Notes: The figure shows stacked bar charts, reporting on the employment-weighted industry structure in the NUTS-2-regions belonging to STRING (label A) or the Jutland Corridor (label B). Each colored block refers to the share of employees observed in a NACE-2-digit industries in total employment of all industries considered.
Source: Eurostat/ARDECO, own illustration and calculations.

Similar to SE-A, the differences between DK02 and DK03 in DK-A increase once the size of the sectors, measured in employment shares, is accounted for. Again, the differences stem from the lower part of the bar, reporting on manufacturing industries and related sectors. But also the bars on the top, north of the orange retail trade (G47) around the 50 percent line, show different patterns of specialization. Even more pronounced are increasing differences between DK-A and DEF0. However, the structure of the manufacturing industry in DEF0 seems quite similar to that of DK02. Hamburg (DE60) and Hovedstaden (DK01) show comparatively unique specialization patterns, particularly in the service industries.

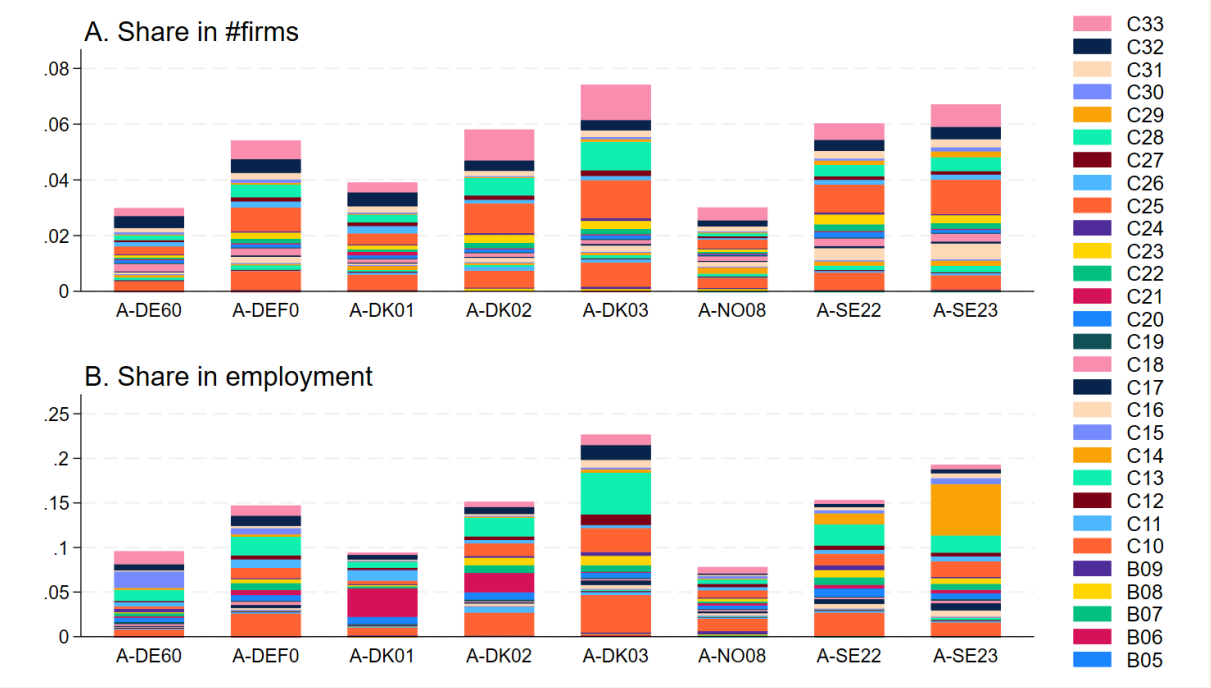
Similarities by Sector

The following figures look more closely into the different subsectors. Please note that the color-codings do not correspond to the colors in Figures 42 and 43. The legend reports NACE-codes, the corresponding description of sectors can be found in Appendix B.1. The figures proceed from the bottom to the top of the bars depicted in Figures 42 and 43 above. The scale on the ordinate indicates the relative size of the

subsectors in relation to the full bars in Figures 42 and 43. For expositional reasons, regions belonging to the Green Jutland Corridor are excluded from this detailed examination.

Starting from the bottom, Figure 44 reports on Sectors B and C, i.e., mining and quarrying, as well as manufacturing. The upper panel A shows industry shares, based on the number of businesses. The lower panel B reports on sectoral employment shares in overall employment.

Figure 44: Similarities in NACE-Sectors B-C—STRING



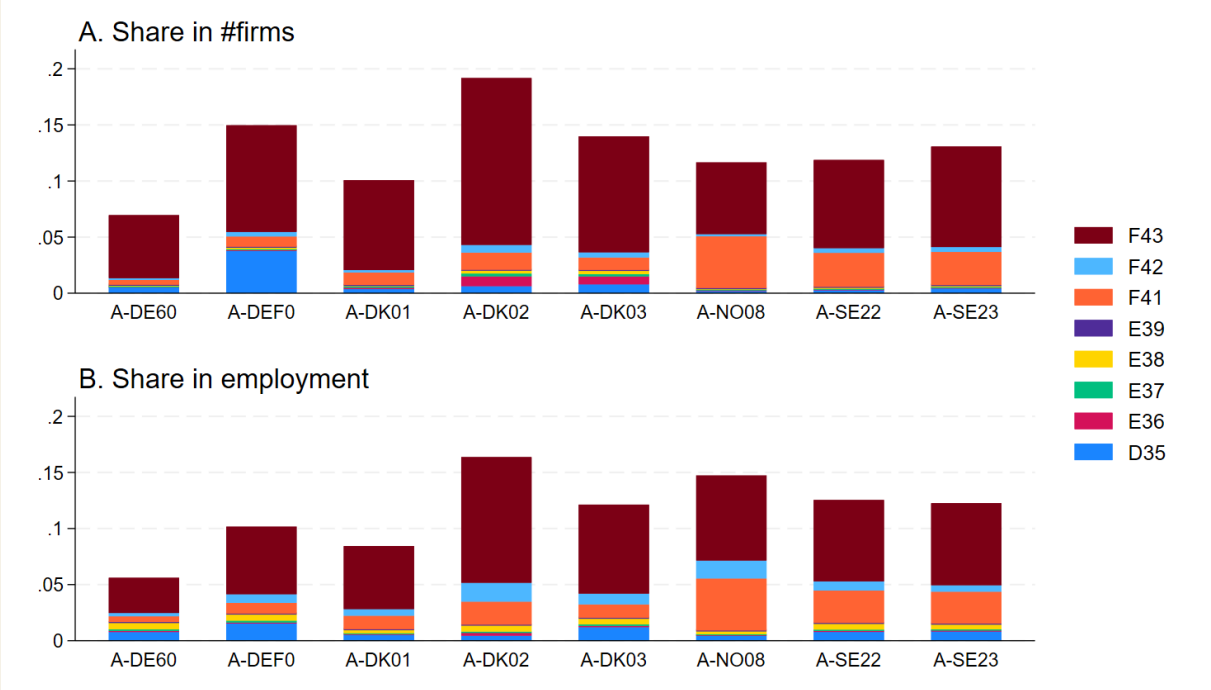
Notes: The figure shows stacked bar charts, reporting on the industry structure based on sectoral shares in the overall number of business (upper panel) and the overall number of employees (lower panel) in the NUTS-2-regions belonging to STRING for Nace-categories B–C. Source: Eurostat/ARDECO, own illustration and calculations.

Depending on natural resources, some regions host firms active in mining and quarrying (Sectors B at the bottom) but overall, manufacturing is more important. Looking at the y-axis, it is clear that manufacturing is more important in terms of employment (around 10 Percent or more) than in the number of local firms (less than 8 Percent). Obviously, this industry is less important in the agglomerations.

All regions manufacture food products (C10, orange bar at the bottom). Moreover, manufacture of machinery equipment (C28, green bar in the upper half) plays a role for most. Apart from that, despite similarities in the number of firms per sector (upper panel), regions have specialized in different sectors within manufacturing (lower panel). Västsverige (SE23) has some focus on manufacture of motor vehicles, trailers and semi-trailers (C29, orange in the upper part). In comparison, Sydsverige (SE22) is more diversified, and Oslo og Viken (NO08) even more. For Syddanmark (DK03), Sectors C33 and C32 at the top play some role (as for others), but these are residual categories like “repair” and “others”. Moreover, manufacture of electrical equipment (C27, brown) is more important than in other regions. In comparison, manufacturing has the

highest relevance in DK03. In Sjælland (DK02) and Hovedstaden (DK01), manufacture of basic pharmaceutical products and pharmaceutical preparations (C21, red) is more important than for others, a sector that relates to the blue bar below (C20, Manufacture of chemicals and chemical products), which can be found in other regions as well. In relative terms, manufacture of other transport equipment (C30) is of some importance for Hamburg (DE60). Figure 45 repeats this exercise for NACE-categories D–F, i.e., Electricity, gas, steam and air conditioning supply; Water supply, sewerage, waste management and remediation activities; and Construction.

Figure 45: Similarities in NACE-Sectors D-F—STRING



Notes: The figure shows stacked bar charts, reporting on the industry structure based on sectoral shares in the overall number of business (upper panel) and the overall number of employees (lower panel) in the NUTS-2-regions belonging to STRING for Nace-categories D–F. Source: Eurostat/ARDECO, own illustration and calculations.

Overall, Sectors D–F account for about 7–19 Percent of the regional firms (upper panel). Weighting by population does not change much of the picture, suggesting that the sectors are dominated by smaller firms, specifically in construction (lower panel). Within construction, the relative importance of specialized construction activities (FE43, brown on top), civil engineering (FE42, light blue) and construction of buildings (FE41, orange in the middle) varies between the regions. All further graphs will report on service industries, starting with Sectors G–I in Figure 46, i.e., Wholesale and retail trade, repair of motor vehicles and motorcycles; Transportation and storage; Accommodation and food service activities.

Indeed, the sectoral composition here looks quite similar throughout the STRING regions. Between 22 and 30 percent of all firms belong NACE-categories G–I (upper panel), employing 30–40 Percent of the overall workforce (lower panel). However, this is not a peculiarity of STRING, but rather reflects the relevance of some of these sectors

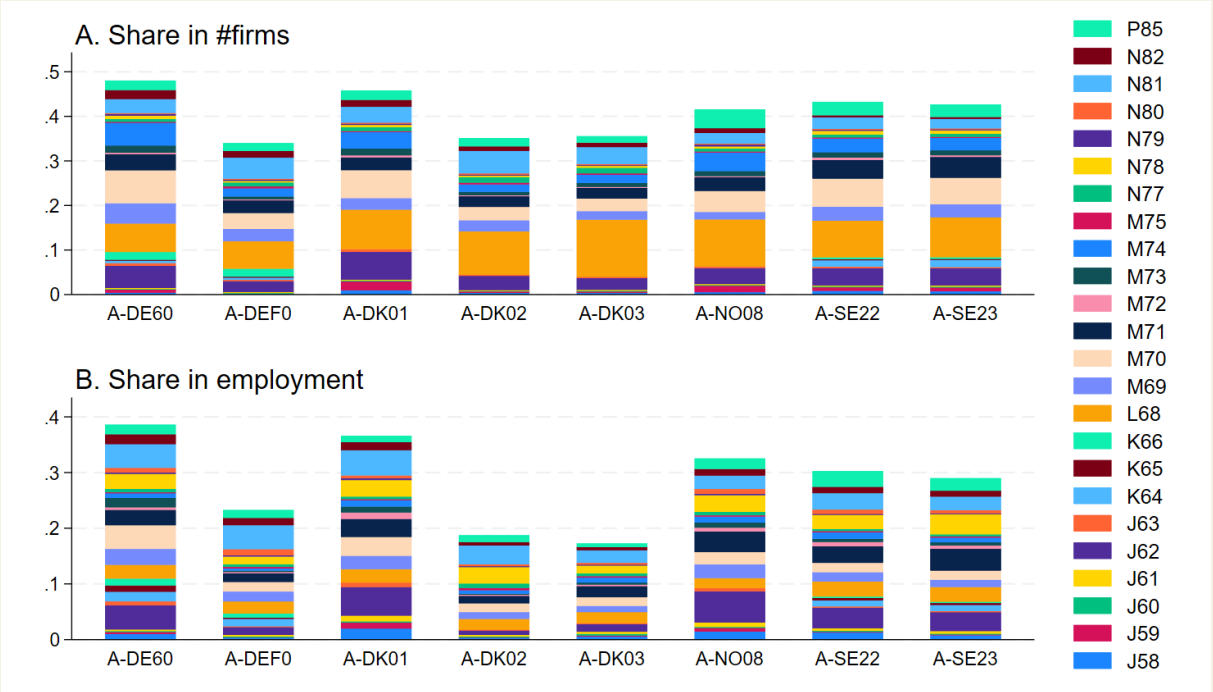
Figure 46: Similarities in NACE-Sectors G–I—STRING

Notes: The figure shows stacked bar charts, reporting on the industry structure based on sectoral shares in the overall number of business (upper panel) and the overall number of employees (lower panel) in the NUTS-2-regions belonging to STRING for Nace-categories G–I. Source: Eurostat/ARDECO, own illustration and calculations.

for the European economies more broadly. Looking at the lower panel, some specialization patterns emerge. Retail trade (G47, green in the middle) is of stronger relevance in Sjælland (DK02). Moreover, Hovedstaden (DK01) has some focus on Sectors H (Transportation and Storage). Within this broader sector, warehousing and support activities for transportation are of some relevance in the harbor-city Hamburg (DE60, light blue bar for Sector H52). Next, Figure 47 more closely examines Sectors J to P, i.e., Information and communication services (J); Financial and insurance activities (K); Real estate activities (L); Professional, scientific and technical activities (M); Administrative and support service activities (N); and Education (P). These services are regarded to be comparatively skill-intensive.

Comparing the share of firms per sector (upper panel) with their share of employment (lower panel), the sectors depicted seem to be dominated by small and medium size enterprises. This is very evident for real estate activities (L68), i.e., the orange bar around the 10 Percent line in the upper panel of Figure 47. Quite a number of firms are active in this sector (upper panel), but they employ comparatively few people (lower panel). As expected from theory, the skill intensive service sectors are concentrated in the agglomerations DE60, DK01, and NO8, specifically, when employment shares are considered (lower panel). However, also in Sydsverige (SE22) and Västsverige (SE23), the combined sectors account for about 30 percent of employment.

Figure 47: Similarities in NACE-Sectors J-P—STRING



Notes: The figure shows stacked bar charts, reporting on the industry structure based on sectoral shares in the overall number of business (upper panel) and the overall number of employees (lower panel) in the NUTS-2-regions belonging to STRING for Nace-categories J–P. Source: Eurostat/ARDECO, own illustration and calculations.

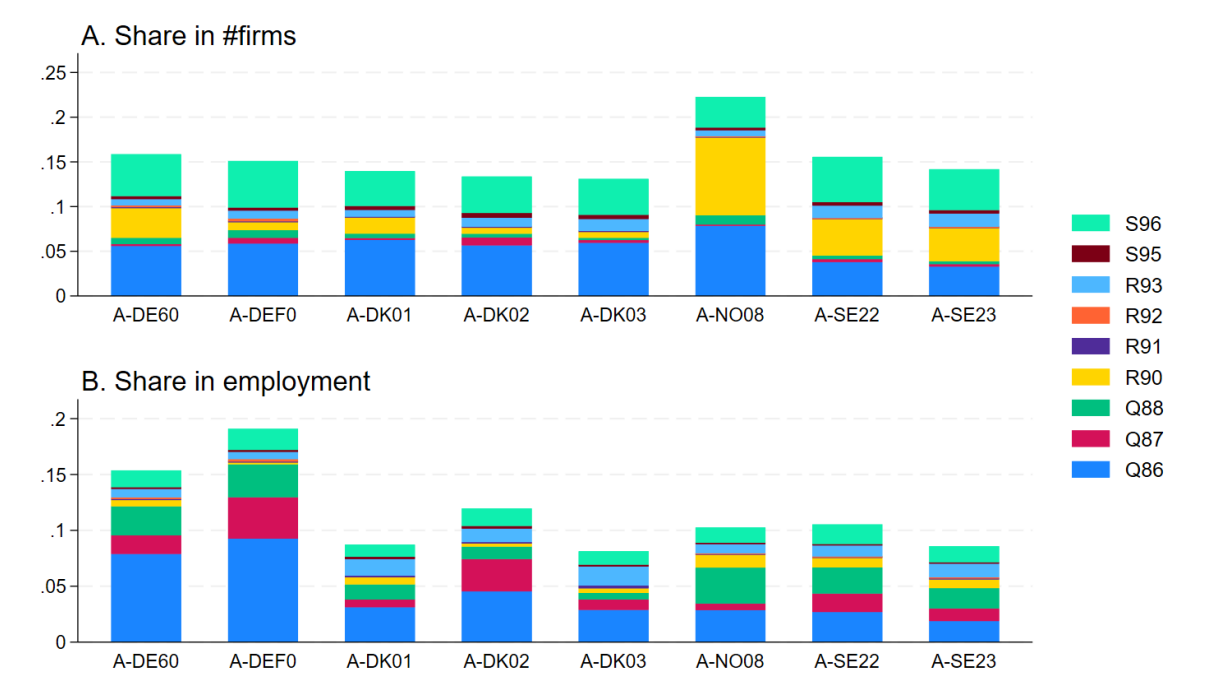
Regarding the sectoral composition, there is a strong overlap between Hovedstaden (DK01) and Oslo og Viken (NO08). Moreover, SE22 and SE23 are very similar (SE-A), and closely resemble NO08. The main difference is a higher share in computer programming, consultancy and related activities (J62, purple bar at the bottom) in NO08. North of Sector M70 (activities of head offices; management consultancy activities), Hamburg's industry structure (DE60) is also very similar to DK01, NO08, and SE-A. Specialization patterns differ at the bottom of the graph for industries J and K. In general, differences in the sectoral composition between STRING members are more pronounced for the bottom parts reporting on information and communication services and financial and insurance activities. In DEF0, DK02 and DK03, the sectoral composition of skill-intensive services shows less overlap with the other STRING members.

Eventually, Figure 48 reports on the remaining Sectors Q–S, i.e., Human health and social work activities; Arts, entertainment and recreation; and Other household-related services activities. These services contribute to a region's amenities that are particularly relevant for attracting residents.

Oslo og Viken (NO08) hosts an outstandingly high share of firms in creative, arts and entertainment activities (R90, yellow bar, upper panel) that employ only few people (lower panel). Otherwise, the aggregate sectors account for around 15 percent of the business population in STRING (upper panel). Accounting for employment, the sectors are most relevant for Hamburg (DE60) and Schleswig-Holstein (DEF0), specifically due to the comparatively high share of employment in human health activities (Q86, blue at the bottom) and—to a lesser degree—residential care activities (Q87, crimson bar above).

Social work activities without accommodation (Q88, green bar above) is of some relevance in Oslo og Viken (NO08), but also in Schleswig-Holstein (DEF0), Hamburg (DE60), and the Swedish regions. Interestingly, creative and leisure activities (categories R) are less concentrated in the agglomerations than expected. Specifically, the Swedish regions show a broader yellow bar (R90) than DE60 or DK01.

Figure 48: Similarities in NACE-Sectors Q–S—STRING



Notes: The figure shows stacked bar charts, reporting on the industry structure based on sectoral shares in the overall number of business (upper panel) and the overall number of employees (lower panel) in the NUTS-2-regions belonging to STRING for Nace-categories Q–S. Source: Eurostat/ARDECO, own illustration and calculations.

Looking for Complementarities

Altogether, regarding the prospects for an intensified economic integration of STRING, the current industry structures provide an inconclusive picture. There certainly are overlaps, but often, similarities between regions belonging to the same national economy are stronger than similarities within STRING. Interestingly, similarities increase when looking at the share of businesses in a sector, instead of employment shares. Accordingly, there is a potential for further integration. Imagine a sector X, that employs few people in regions a., b., c., buts hosts many firms. Such small and medium-sized firms may particularly benefit from agglomeration dynamics, allowing them to grow along industry- or technology-lines. Looking at the very existence of business activity in different sectors, the STRING-economy seems “ready” to further integrate.

What is more, differences between STRING regions are more pronounced in the (broad) manufacturing sector than in the (broad) service sector. Accordingly, differences largely stem from specialization patterns of the past, when growth was driven by industrial production. In high-wage economies like STRING, future growth depends much

more on the services industries (that also affect the productivity in manufacturing along value chains). Accordingly, given the more pronounced overlap in the composition of service industries, these sectors may well be the driver of an even closer economic cooperation between the STRING members.

In the light of theoretical sketch outlined in Section 2.2, integration into a mega-region should be driven by strengthening ties between the urban agglomerations, which then spills over to the less-agglomerated regions connected to the network. In the NUTS-2 data, the regions DE60 (Hamburg), DK01 (Hovedstaden) and NO08 (Oslo og Viken) represent such agglomerations. Characteristically, all these regions are more focused on services than manufacturing, but show quite distinct specialization patterns. Accordingly, strengthening ties between those regions would rather foster between-sectoral cooperation, than within. This may diminish the advantages of just having a larger combined market (in Sector X). However, it may facilitate diversification, if suppliers for Sector Y start serving Sector X as well.

Eventually, looking at industry similarities only misses the point of complementarities. Different sectors are connected via input-output-linkages, that are not observed in the data. The patterns observed do certainly not rule out that the regional economies of STRING would benefit from a further integration. More generally, with Section 2.2 in mind, one would expect economic integration to provide potentials for growth, without pre-determining the direction of development. It is up to businesses to explore economic opportunities resulting from the agglomeration forces observed in Section 4. Even if this would not lead to STRING fully integrating into a mega-region with a unified production network, it would still strengthen the economic ties within the broader economic area, spurring economic activity that would not exist without the network.

Of course, the economic integration of STRING does not proceed in isolation. All members are embedded in national economies, and affected by cyclical influences that transcend the region. At the same time, regional networks can help to cope with macro-economic shocks. Networks provide an inherent insurance function, since regular exchange creates trust. This may increase the flexibility to adjust to external shocks, if actors can cooperate without a well-defined contractual basis. Specifically, cross-border cooperation as in STRING contributes to strengthening European resilience. A regional network's exposure to shocks crucially depends on the network structure. Homogeneous networks are more strongly affected by the same shock, but also have a joint incentive to react and adjust. Heterogenous networks are more flexible to adjust to shocks, but may face competing interests of its network members regarding the new direction. This Section 5.2 suggests that STRING has a little bit of both.

In any case, regional networks may help to find local solutions to global problems. This, in turn, may provide business opportunities if the local solutions are good enough to being scaled up. A case in point is STRING's exposure to climate change. Most obviously, climate change affects the world economy as a whole. However, since all STRING members are located at the Baltic Sea, they are jointly exposed to some specific consequences of climate change, e.g., stemming from rising sea levels, or water

temperature. Thus, joining forces to cope with the impacts of these specific impacts should increase the probability to find workable solutions. Certainly, this joint threat creates incentives to work together more closely. This may spur innovation, that can be the basis for sectoral growth in the future.

Along that line, STRING has a history of cooperating on clean energy production, and exploring alternatives to fossil fuels. On that basis, STRING identifies as a “green hub”. Again, the Baltic Sea provides some common ground for such activities, since it allows producing clean energy from wind and water. Obviously, such activities benefit from scale economies, i.e., partners coordinating on establishing the respective infrastructure. What is more, there are strong incentives to cooperate in R&D to improve the efficiency of clean energy production around the Baltic Sea. Such innovations may well spur business opportunities, if they allow for producing goods and services that can be exported to other regions. Typically, the challenge is to scale feasible solutions up to a level where production becomes economically reasonable. Here, coordination between local authorities may help to overcome zero-sum-thinking, i.e., supporting projects benefitting the whole network, even if they are located in a different area. Similarly, increased security threats may be addressed by regional cooperation, specifically in fields that affect security in the Baltics Sea, thus posing a joint and specific threat to all member regions. This issue will be discussed more intensively in Section 5.4 below. First, however, the expected impacts of the Fehmarn Belt Fixed Link on furthering the integration of STRING will be examined.

5.3 The Role of the Fehmarn Belt Fixed Link

The construction of a fixed Fehmarn Belt link (FBFL) is one of the key infrastructure projects in the STRING region (c.f. Section 3.4). Closing this gap in the ScanMed corridor will improve connections to central and Southern Europe, while also contributing to better connectivity within the STRING region itself by reducing travel times by road and rail. Before the enlargement of STRING by cities and regions outside the Fehmarn Belt corridor, the FBFL was also assigned an integrative role for the entire STRING region: urban centers and their Hinterland were to grow together into a functional economic area.

However, doubts had already been raised in the past as to whether the economic benefits of the FBFL would be evenly distributed across the STRING region. The willingness on the Danish side to take on most of the financing for the FBFL can be explained by the fact that significant revenues were expected from lower distance costs, particularly for the corridor from Southern Sweden to Lolland. At the same time, the shift in traffic and the concentration of investment funds on the FBFL meant that disadvantages were feared for the Jutland corridor. On the German side, the advantages of the FBFL were also seen to be concentrated along the Fehmarn Belt corridor. The enlargement of STRING by regions that can be broadly classified as part of the Jutland corridor (in

terms of transport axes, subsequently: the extended Jutland corridor) reinforced doubts about the integrative effect of the FBFL.

As a large number of studies on the economic effects of the FBFL have been conducted over the past 20 years, it is possible to derive an overview of the possible regional distribution of these effects. Based on these studies, a number of fields can be identified in which FBFL effects are expected to occur with varying intensity in the individual STRING regions. These include: growth effects, changes in distance costs and travel times, access to international markets, competitiveness, technical progress, tourism, port traffic, labor market effects, commuter traffic, and locational decisions of companies and residents. However, the results of the studies are often imprecise and subject to a high degree of uncertainty, so that only general trends can be identified with regard to the regional distribution of the effects. Nevertheless, the synoptic presentation of the study results in Appendix C reveals a distributional pattern that highlights the differences between the regions in the Fehmarn Belt corridor and the (extended) Jutland corridor.

For the STRING region as a whole, various model calculations predict short- and long-term welfare gains due to increased competitiveness and productivity resulting from the construction of the FBFL. Most studies suggest that transport costs and travel times between Scandinavia and Germany will decrease significantly. However, the relevance of the older studies is limited because they were prepared before the STRING enlargement and therefore do not take into account the structural changes caused by new members further away from the FBFL. However, early studies had already pointed out that distance from the FBFL plays a role in the expected strength of its economic effects.

The synoptic evaluation of the study results for the individual STRING members confirms this assessment. Growth effects and transport cost advantages are expected primarily along the Danish part of the Fehmarn Belt corridor, while these are expected to be weaker in the other Scandinavian and German Fehmarn Belt regions. The STRING region of Syddanmark, which joined later, is not included in these analyses. As part of the extended Jutland corridor, it is not expected to be (positively) affected by the FBFL.

For Kiel, the state capital of Schleswig-Holstein, which is also located further away from the Fehmarn Belt, there are a few statements, but these remain largely vague and lack detail: growing competition and increasing productivity are expected to contribute to Kiel's growth, as Danish and Swedish companies would have easier access to the Northern German markets, which would reduce the market power of existing suppliers and intensify competition. Improved accessibility to Scandinavian markets is also expected to enable economies of scale in production and lead to lower unit costs and increased productivity. Kiel, like other regions in Northern Germany, is expected to benefit from these effects, while the FBFL has no relevance for economic development outside Northern Germany. For Kiel, a growth effect four times higher than Kiel's share of German GDP is predicted. However, this equals the expected benefits of Lübeck, even though it is part of the Fehmarn Belt corridor – this features the missing regional disaggregation of the FBFL-studies.

In addition, one study suggests that the port of Kiel is set to benefit from improved accessibility for freight transport–albeit in a similar way as all other Northern German ports. According to a more specific estimate, the port of Kiel would tend to lose freight volume due to a shift in goods flows, and the development of ferry connections would also be negatively affected. But it remains unclear what the net effect will be. It is also difficult to measure the benefits of improved networking between Northern German universities and research institutions and partners in Eastern Denmark and Southern Sweden – for Kiel, interfaces with the Öresund region are envisaged in the fields of marine and geosciences. Finally, gains in tourism are expected from a growing number of day- and short-term-visitors from Scandinavia, from which Kiel and–to an even greater extent–Lübeck are expected to benefit.

This overview leads to the conclusion that, due to the relatively heterogeneous membership structure of the STRING region, which encompasses both the Fehmarn Belt corridor and parts of the extended Jutland corridor, the FBFL alone is unlikely be a comprehensive driver of integration and growth for all STRING members alike. To directly benefit from the FBFL, STRING members further away from the Fehmarn Belt would have to invest into road and train connections to the FBFL–or seek benefits of their membership in other areas of cooperation, c.f. Section 2.2. Disregarding distributional effects, the FBFL has a strong potential to foster economic growth in the STRING megaregion.

With great certainty, the establishment of the FBFL will change the economic geography not only for STRING, but for the broader economic area around the Kattegat. A direct connection of two of the most important agglomerations in STRING will foster agglomeration dynamics along that link. The question is not so much whether this will have an economic impact, but how strong it will be. In general, infrastructural investment takes time to materialize in economic growth. Most plausibly, the link will benefit both Hamburg (DE60) and Hovedstaden (DK01). For the regions on route, it creates opportunities to better connect to the urban centers, spurring opportunities for growth and development.[42] As such, the new infrastructure has a great potential to fostering agglomeration dynamics in the STRING region. To fully reap the benefits, connections to Hamburg or to Copenhagen will have to be improved more broadly. Specifically, to really grow into a mega-region, it seems important to expedite the connection to Oslo, via Gothenburg–and to strengthen links to the STRING-regions more remote to the FBFL.

5.4 The Role of Geopolitical Threats

Unfortunately, the whole region is subject to a common threat from an aggressive Russian government. Unimaginable for many years, a military confrontation in the Baltic Sea cannot be ruled out anymore. Preparing for military threats is the original task of

[42] Ahlfeldt and Feddersen (2017) show that establishing a highspeed rail connection between Cologne and Frankfurt benefitted counties with intermediate stops along the route. Similar effects could arise in the peripheral regions between Hamburg and Copenhagen.

national governments. However, even in the more likely case that the Russian government will not attack NATO-allies directly, one has to prepare for a continued disturbance of shipping routes through the Baltic Sea by Russian military vessels, incursions of drones, and sabotage. Accordingly, apart from the general military threat, there are specific threats from asymmetric warfare that specifically affect the regions adjacent to the Baltic Sea. Conversely, these regions have a unique experience in maritime sciences and technology, that may help to find specific solutions to protecting offshore infrastructure and trade routes. In the broad picture, security investments are likely to benefit the region, specifically after the NATO-accession of Sweden and Finland, that ask for updating the transportation infrastructure in Northern Europe. Locally, innovative firms may contribute to developing technologies that help to counter the asymmetric threat of foreign sabotage, e.g., by advancing sensorics for surveillance or improving underwater drones that protect submarine cables. This is happening already, and certainly provides growth potential for the defense sector in STRING. To foster the economic impact—and reimburse public spending in the sector—spillovers to the civil sector should be facilitated. Here, public-private-partnerships of research institutions and companies may help to realize multiplier-effects, i.e., innovations developed for military purposes being used to improve products used at broader scale by private customers.

The new security challenges facing NATO and the EU in the wake of Russia's war of aggression require greater upgrading of the Trans-European Transport Network (TEN-T) for military transport than in the past. This is because the overlap between TEN-T and the EU's Military Mobility Network is around 94 percent. Any investment in improving the TEN-T infrastructure therefore also leads to an improvement in military mobility (ECA 2025: 10). Since in the STRING region the Scan-Med Corridor runs through both the extended Jutland corridor and the Fehmarn Belt corridor, the entire region can, in principle, benefit from military-relevant investments in dual-use transport infrastructure.

In view of the security policy challenge to make the European transport network more resilient, additional funding will most probably be available at EU level in the future. An initial EU action plan to promote military mobility from 2018 was revised and expanded in 2022 with Action Plan 2.0. In line with these action plans, more than EUR 1.7 billion was made available by 2023 under the “Connecting Europe Facility” (CEF) through three calls for proposals for a total of 95 projects. This funding was significantly lower than the originally estimated €6.5 billion, as changes were made to the “Multiannual Financial Framework” (MFF) due to the COVID-19 pandemic. The projects serve to upgrade dual-use transport infrastructure for railways, roads, airports, seaports, inland waterways, and multimodal terminals for military transport. In the STRING region, in the 2022 and 2023 calls for proposals, four projects in Denmark and one project in Sweden with a total volume of approximately EUR 120 million were considered.[43]

[43] See EU Commission (2023), CINEA (2024a, b) and ECA (2025: 7–11).

Since then, promoting military mobility has become even more of a political focus: in 2023, the EU Council of Ministers made military mobility a strategic priority, and in 2024, it pledged that member states would prioritize investments in dual-use infrastructure to increase military mobility (Chihaia 2025: 2). In line with that, the European Parliament and the Council of Ministers adopted a revised TEN-T regulation in June 2024, which for the first time took into account the objective of military mobility and the derived standards in the TEN-T network (ECA 2025: 12, EP 2025a: 5). On its own initiative, the European Parliament also commissioned a draft report on military mobility in 2025, which calls for the military upgrading of dual-use infrastructure and sufficient funding for this purpose. Amendments to the draft emphasize the special importance of seaports for military mobility and economic connectivity and support the financing of port expansion within the framework of the CEF (EP 2025b,c). In this context, European seaports advocate a broad definition of dual-use port infrastructure, which should include not only port facilities but also the associated Hinterland connections – these investments should be secured in the long term in the EU's new MFF (ESPO 2025:2).

In order to end the underfunding of military mobility projects, the EU Commission has proposed increasing the CEF budget to EUR 51.5 billion for the next MFF 2028–2034, of which EUR 17.6 billion is to be used for military mobility – a tenfold increase on the previous budget (EP 2025a: 2). In addition, there are financing options under the European Investment Bank's (EIB) Strategic European Security Initiative, which has a volume of EUR 8 billion (ibid.: 8).

Against the backdrop of the growing importance of military mobility and the prospect of additional EU funding for investments in dual-use infrastructure, joint initiatives by the STRING megaregion could give its members an advantage in competing for these infrastructure funds. Joint STRING infrastructure planning, encompassing the dual development of the TEN-T network in the STRING area, would have the advantage of a network perspective and greater political weight than initiatives by individual regions. This would improve the internal and external connectivity and resilience of the entire STRING region, and regions in both corridors could benefit. Accordingly, cooperating with the regions belonging to the Green Jutland Corridor might increase the probability of winning funds for updating infrastructure that is of military use, but strengthens connectivity around the Kattegat more broadly.

The seaport of Esbjerg in the STRING region of Syddanmark is a positive example of efforts to secure infrastructure funding to improve military mobility: the seaport is receiving a grant of EUR 28.3 million from the CEF and a loan of EUR 115 million from the EIB. These funds will be used to deepen the harbor basin so that both military vessels with a large draught and transporters for large offshore wind turbines can use the port. This will further develop the port as a military hub on the one hand and as a civilian transport and logistics hub within the TEN-T network on the other (Koh 2024, EIB 2024).

Similar to the seaport of Esbjerg, dual infrastructure investments in STRING regions that have had no or insufficient access to EU funds to date could become more likely

with the greater institutional weight of the STRING megaregion. For example, the seaport of Kiel, which has not yet been included in the TEN-T network as an EU core port, would be a potential candidate for EU funding. In Kiel, potential for further developing the port as a military and civilian hub exists, which could be leveraged through investments in port infrastructure and Hinterland connections.

These considerations on military infrastructure are a case in point for the advantages of building institutional structures for the governance of megaregions, as in STRING. First, they provide a platform for regional actors to coordinate on the local needs for infrastructural development, thus fostering the dual-use character of military investments. Second, it gives these needs more leverage, if a central actor can negotiate with national or European entities, specifically if this actor speaks for urban as well as less-agglomerated areas in different European countries. Third, it facilitates coordination with external stakeholders, for instance, regions belonging to the Green Jutland Corridor in this specific case. Fourth, successful cooperation in an area of joint interest may be the breeding ground for follow-up projects on related issues, e.g., initiatives for strengthening joint R&D between private and public partners on the development of dual-use solutions for securing the Baltic Sea more broadly, thus adding to the resilience of the STRING megaregion and beyond.

Such opportunities of competing together for EU Structural Funds exemplify that there is a value in regional cooperation that goes beyond fostering agglomeration dynamics of mega-regions. Still, this value stems from economies of scale. Joint interests of the STRING members can be more effectively enforced if they are aggregated and communicated by a single agency–not only in reaction to external threats. In comparison with most other megaregions discussed in this study, STRING stands out by having developed institutional structures that allow for a representation of joint interests by the STRING secretariat. It is up to the members to decide in which areas they want to cooperate more closely, and which competencies they want to transfer to the STRING secretariat to achieve common goals–if any. The comparison with other megaregions suggests that flexible solutions are possible when it comes to defining the mandate for the joint body. In any case, given the common threats and opportunities faced by the STRING members, it seems reasonable to coordinate between neighbors across administrative boundaries.

6 Conclusions

Prospects for the Advancement of STRING

STRING has developed dynamically over the last decades, both economically and institutionally. Economic growth has been driven by the urban agglomerations, but the less densely populated areas have benefitted as well. Altogether, STRING seems on a stable growth trajectory.

Clearly, less-developed regions can benefit from the economic success of urban centers if they are well connected, e.g., through commuting, or via production networks. Conversely, connections to the neighboring regions help the centers to mitigate conflicts stemming from the scarcity of space and from congestion. Fostering connections between its members should continue to be a core objective of STRING–regarding infrastructure, business relations, innovation networks, and cultural exchange.

It is a unique feature of STRING that the megaregion transcends the borders of four countries, and includes heterogenous actors with differing levels of development, and different degrees of autonomy. On the one hand, this may hamper the integration of STRING into a unified market of European significance. On the other hand, this contributes to the relevance of the organization, since it convincingly represents a truly European region, that is much more than just a club of large cities. In this sense, it seems fair to speak of STRING as a European megaregion.

Global and European mega-regions were not created artificially, but developed naturally over time. Only gradually, they became observable as coherent areas. Even if STRING does not yet fulfill all criteria of a fully integrated economic area, agglomeration dynamics are clearly visible, that may well lead to a further integration of the regional markets withing STRING. Already now, STRING shows some similarities with other global and European megaregions. By institutionalizing their cooperation, the members convincingly committed to further the integration process, establishing permanent structures that allow for knowledge exchange, coordination of interests, and joint projects.

The megaregions discussed in this study are characterized by increased connectivity between urban centers and the growing integration of their respective Hinterland. The observation of such a functional economic area suggests that its further development should be shaped by some institutional framework to facilitate interregional division of labor and realize efficiency gains. The STRING region can also be observed as a contiguous economic area, as shown by night-time images and indicator-based visualizations of the STRING region. This raises the question how the STRING region can be further developed into a functional megaregion for the benefit of all sub-regions.

The further development of a megaregion can take place in different ways, as the examples evaluated show. The spectrum ranges from the planning and design of a megaregion by a central government actor to a lobby group with a rudimentary institutional

umbrella without own decision-making competences. None of these polar concepts seems appropriate for the development of the STRING region–what is needed here is a differentiated development approach that takes into account the heterogeneity of the membership structure and ensures a balance of interests. The institutional design of the Greater Bay Area in China and the Rhine-Ruhr region in Germany is therefore far off the institutional reality in the STRING region. Integration concepts for mega-regions that show greater parallels with STRING, such as the San Francisco Bay Area or Randstad, suggest the following design elements for the further development of STRING:

- Joint interests as common basis: At its core, STRING is a platform for coordinating joint interests of all its members. This may seem trivial, as it defines the lowest common denominator. However, given the fragmentation of Europe, there is an inherent benefit of having such a platform for regional authorities to coordinate across borders. National regulatory frameworks are given, but with a focus on joint interests, regional authorities can mitigate the barriers to international exchange imposed by national borders.
- Optionality in degree of further integration: Members decide which competencies they want to transfer to the STRING level. This may involve the organization of joint projects, planning powers, the representation of common interests, or a joint location policy. In any case, some transfer of powers to the STRING level is necessary, with the principle of subsidiarity serving as a guideline for the members. This kind of STRING cooperation would be selective in nature, with not only the breadth of integration, but also the depth and speed of integration being adjustable. STRING should be open to initiatives initiated by some members, with an option for other members to join in due course.
- Greater participation of civil actors: The organization of the STRING cooperation is not necessarily limited to a few administrative actors from the member regions. Participation in the development of STRING can be extended to actors from business and civil society, who also network with each other within the framework of joint projects. This would give STRING a broader base, which could increase its visibility and acceptance, and enhance the willingness of the member regions to cooperate.
- Polycentric integration: Member regions within STRING are part of historically grown, functional economic areas that have a higher level of integration and stronger networking among themselves than with other sub-regions. Examples of this would be the metropolitan regions of Greater Copenhagen and Hamburg. In a polycentric structure such as STRING, it means that individual sub-regions jointly represent their interests within STRING, and that a balance of interests must be struck across sub-regions.
- External representation: A major benefit of institutionalized governance structures is that they gain political weight. First, this results from mass: representing an area with 14 million inhabitants, 7 cities and 9 regions gives the STRING organization leverage in negotiations with external actors, e.g., European and

national authorities, but also international partners. In the case of STRING, the regional heterogeneity adds to this leverage, since the organization credibly represents a broad set of interests, not just lobbying for a selective group of cities. To better use this negotiation power, STRING should consider strengthening the mandate of its Secretariat, within clearly defined boundaries.

Regardless of the specific integration approach, a balance of interests between the member regions or sub-regions within STRING is essential for the success of a joint megaregion. This is because each member should be able to recognize the benefits of participating in STRING. Accordingly, the range of STRING activities should reflect the interests of the individual members, while individual projects can serve particular interests. Given the heterogeneity of the membership, a wider range of activities may help to balance interests. This implies that the institutional structures of STRING need to be further developed. The STRING-organization should be committed to an agenda that leads to a balance of interests within STRING. Conversely, members must provide sufficient resources to ensure that tasks are performed efficiently at the STRING-level.

The construction of the Fehmarn Belt Fixed Link is a success for STRING, that actively advocated for this trade route. To fully reap the benefits of this infrastructural investment, it seems important to expand the route to Oslo.[44] Looking at the agglomeration dynamics presented in Section 4, an axis Oslo-Gothenburg-Copenhagen-Hamburg would combine growing urban centers that could indeed provide the "critical mass" for a full-fledged mega-region. Whether they do is not only a question of infrastructural development, but of private businesses exploiting the growth opportunities provided by the new gravity framework, and by residents moving and commuting more frequently within an integrated labor market. Fortunately, this cannot be externally planned. Essentially, the STRING organization is not a business development agency. What can be done, though, is to remove obstacles to cross-regional cooperations, specifically to economic exchange across national borders. STRING does provide an institutional framework for doing so, and looking at the overall picture, the region has been quite successful over the last couple of years.

Infrastructure development continues to be a common interest of all STRING members. This relates to improving the connections along the Fehmarn Belt Corridor to Oslo, but also to expanding the Hinterland-connections to the Fehmarn Belt Corridor. One opportunity is given by the need to upgrade trans-European transport networks for military purposes. More generally, the members are more likely to win European grants and to be considered in large investment projects if STRING coordinates the joint interests—and represents them vis-à-vis national and European institutions. STRING's leverage may be further increased if it seeks cooperation with its neighbors similarly affected, e.g., the regions of the Green Jutland Corridor.

Beyond infrastructure, joint threats pose opportunities for cooperation. STRING addresses the challenges from climate change by cultivating green technologies and

[44] This is about the development of a double track express railway with shorter transport time and higher capacity for freight and passengers on the Norway/Vänern Line and the the Østfold Line.

industries as “green hub”. Similarly, the defense sector may stimulate innovation and growth in the upcoming years. The basis for cooperation in both the green and the defense sector is given just by the existence of businesses active in these sectors. An objective for STRING could be to enhance the visibility of enterprises and their competences in these areas. This might pave the way to cooperations to jointly apply for public funding by the EU or national programs. Reaching out more actively to existing business networks and organizations could also contribute to strengthening STRING’s unique selling point when it comes to defining areas of joint interest and cooperation.

The geo-economic climate has deteriorated more generally, putting pressure on European economies strongly integrated in the global markets. Specifically, geo-economic tensions between the US and China increasingly affect the reliability of supply chains, since both governments do not hesitate to use their political and economic power to control critical parts of international value chains in strategically relevant sectors. Even with a less erratic presidency in the US, this conflict is likely to persist. Part of a European de-risking strategy is to rely more on regional supply chains. Against this backdrop, closer cooperation within the STRING region may contribute to its resilience to geoeconomic tensions–and strengthen its relevance for the European Union.

What remains, independent of geo-political frictions, is the challenges of demographic change. The figures presented in Section 4 show how STRING is affected. For decades, we have been used to discussing the labor market impacts of economic development in terms of unemployment. However, in the nearby future, shortages of labor will have a strong impact on regional growth trajectories in an ageing society. Apart from economic challenges, this implies a societal challenge. Demographic change and urbanization coincide. Particularly young and well-educated people move into the urban centers, leaving behind peripheral regions that hardly manage to cope with structural change. Conversely, cost of living increases in urban centers, challenging the livelihood of residents at the lower end of the wage distribution. Throughout Europe, this development has contributed to increasing dissatisfaction with the institutions of the market democracy. Against this backdrop, accounting for the interdependencies in the economic development of urban centers and less-agglomerated areas seems key to mitigating the conflicts resulting from urbanization, that are exacerbated by demographic change. The organization of STRING provides a viable framework for balancing the interests of urban and peripheral areas to the joint benefit of all members, thus adding to the goal of sustainable growth.

Policy Recommendations

Based on the results of this study, we recommend that STRING should focus on the following issues and initiatives:

- STRING should continue to foster the economic integration of its members. Specifically, economic exchange across national borders can still be intensified.
- To do so, STRING should reach out more actively to existing networks of regional businesses and economic stakeholders. One way would be to establish a

dedicated business membership arm to engage private-sector actors more systematically.

- The development of traffic infrastructure remains key to fostering economic integration. STRING should lobby for both strengthening the axis connecting the main agglomerations Hamburg-Copenhagen-Oslo, and connecting the less agglomerated areas to this axis.
- STRING should coordinate and support efforts to strengthen the regional infrastructure for dual use, including transport and energy systems, and proactively seek EU funding for these projects.
- The experiences made as "green hub" should be used for building supportive ecosystems for innovation and growth in sectors of joint interest for the members, e.g., the defense sector, or knowledge-intensive services.
- Such activities could be more strongly focused on activities that are unique to STRING, thus providing the potential to strengthen comparative advantages vis-à-vis other European regions.
- The institutional structures of STRING provide a valuable platform for coordination between regional authorities across borders, and for identifying areas of joint interest. This function should be cultivated.
- The mandate of the STRING secretariat to represent the region vis-à-vis external partners should be strengthened. STRING's international composition of heterogenous actors provides strong leverage in negotiations with national and European authorities that might be used more extensively.
- The STRING members should consider the formation of a "European Grouping for Territorial Co-operation" (EGTC) for deepening their collaboration, as already proposed by the OECD.
- STRING must take into account the different interests of its members in its activities and aim to balance these interests in order to maintain the attractiveness of STRING membership.
- To initiate further projects, STRING might consider governance structures that allow for optionality. Certain projects may be of greater interest for some members than for others, and they might be more willing to transfer competencies on these specific matters.
- In areas of common interest, STRING should regularly reach out to its neighboring regions. Specifically, the regions of the Green Jutland Corridor share some economic and political interests that may be easier achieved through joint advocacy.
- The public visibility of STRING needs to be increased.

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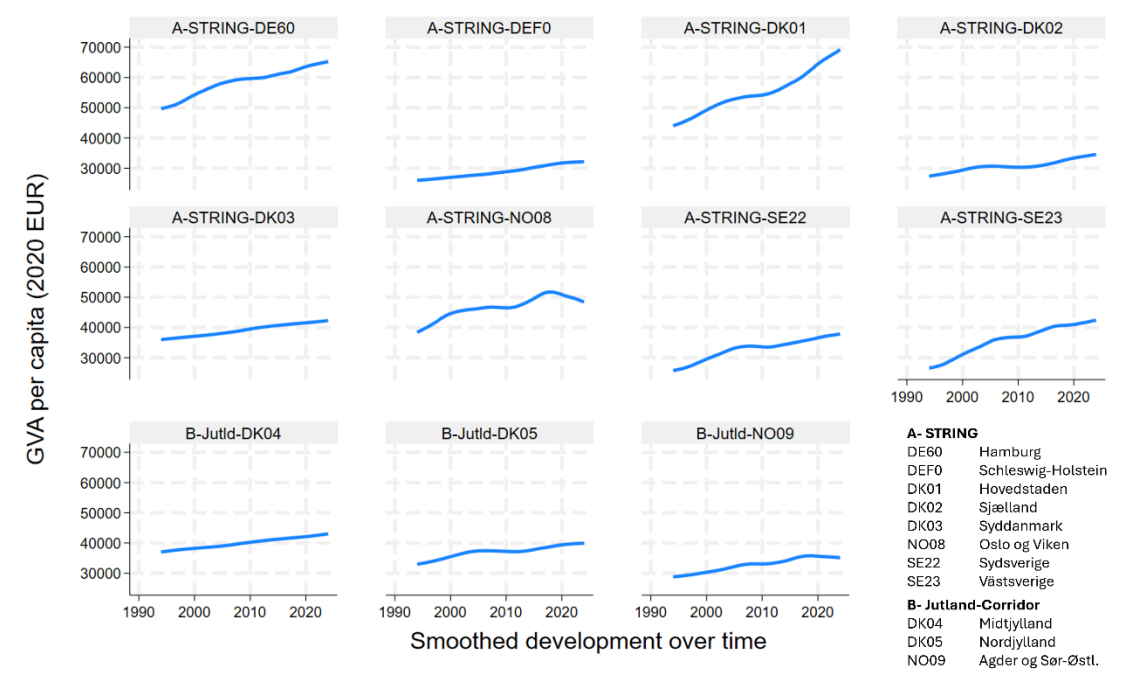
Appendix

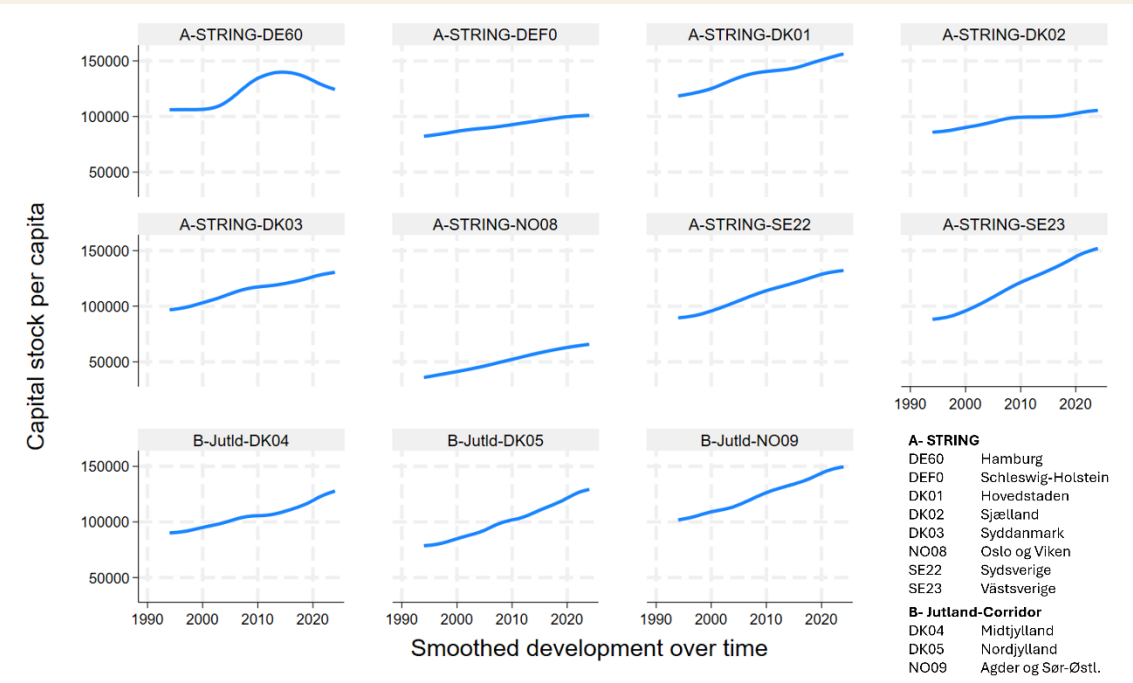
A. Additional Graphs

Figure A.1: GVA Per Capita Over Time—Regional Variation Within STRING



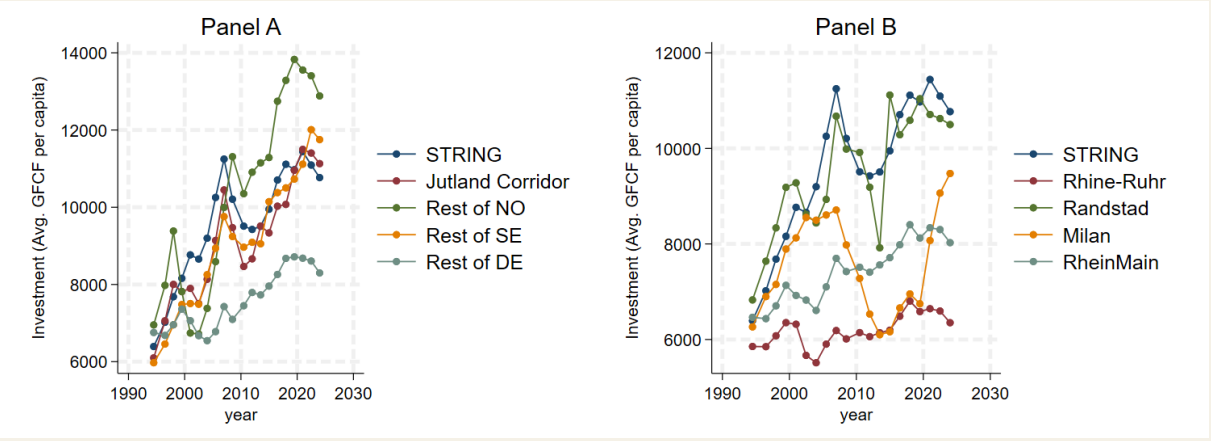
Notes: The figure shows smoothed time-series plots, reporting on the development of Gross Value Added (GVA) per capita over time for all NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

Figure A.2: Capital Stock Per Capita Over Time—Regional Variation Within STRING



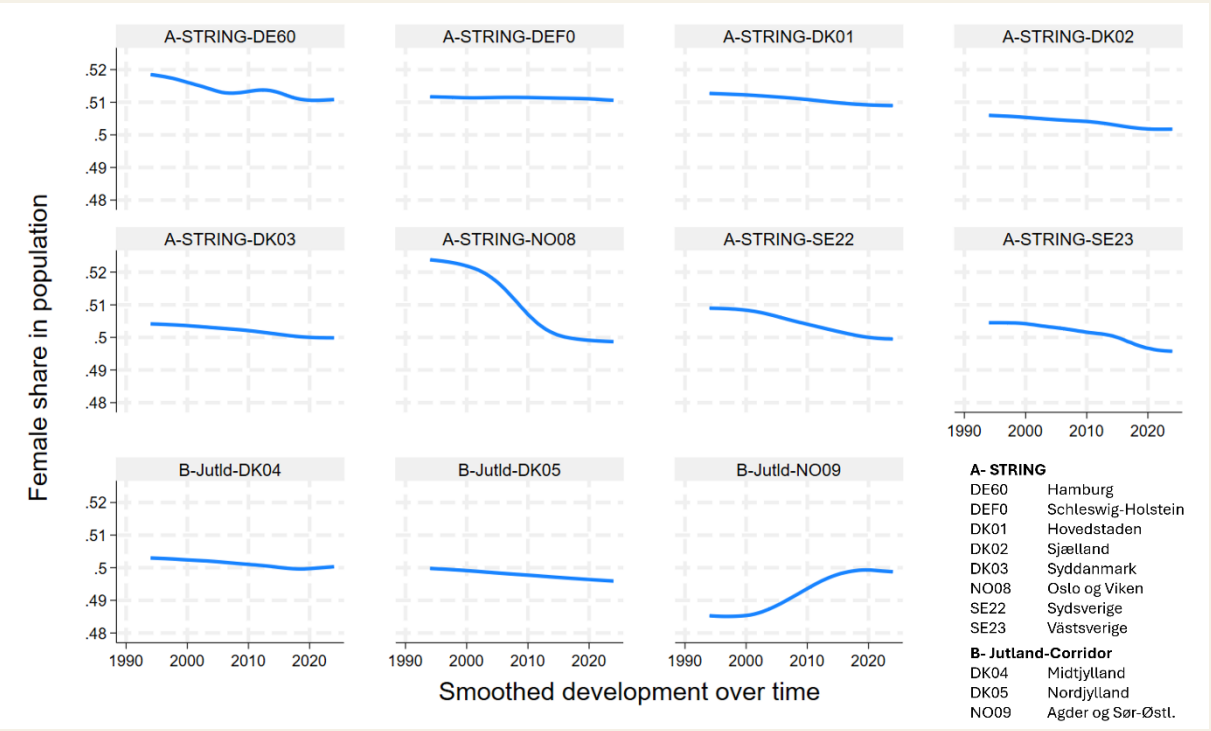
Notes: The figure shows smoothed time-series plots, reporting on the development of the capital stock per capita over time for all NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

Figure A.3: Investments (GFCF) Per Capita—Broader Regions



Notes: The figure shows binscatter-plots, reporting on an average NUTS2-region contained in the broader regions described. The left panel compares Gross Fixed Capital Formation (GFCF) per capita in the STRING-regions to the Jutland corridor and the rest of Norway (NO), Sweden (SE), and Germany (DE). The right panel compares STRING to other European Megaregions. Source: Eurostat/ARDECO, own illustration and calculations.

Figure A.4: Female Population Share Over Time—Regional Variation Within STRING

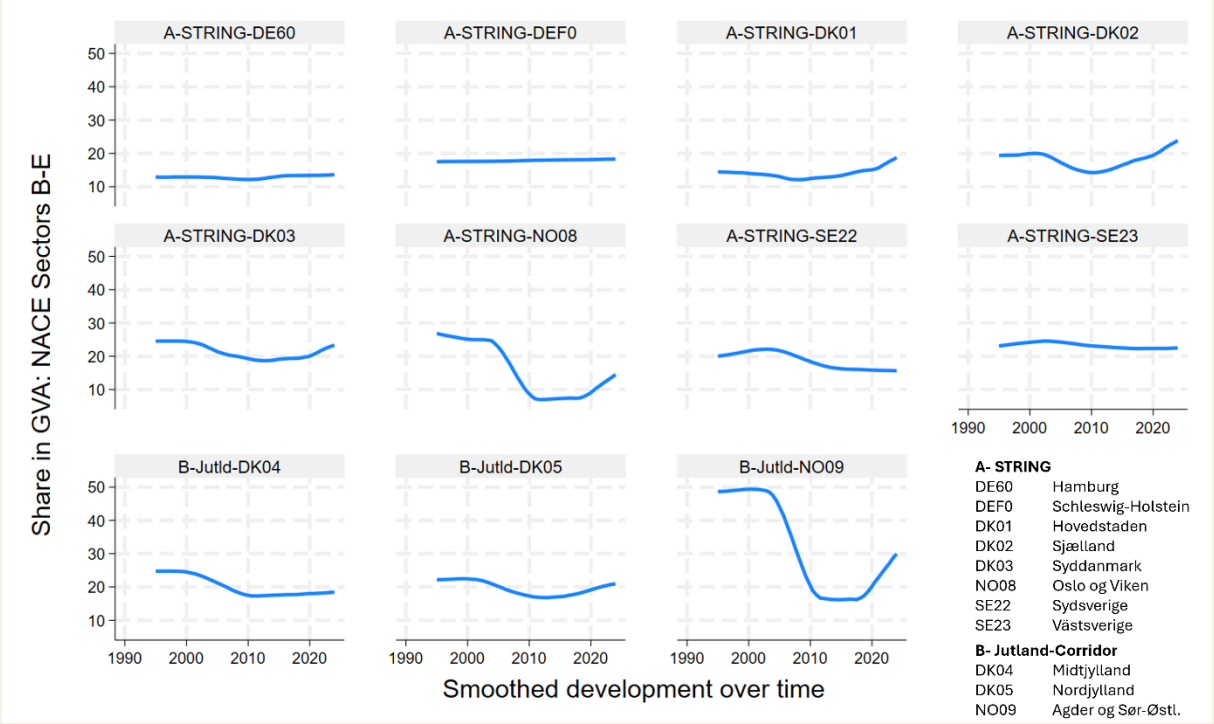


Notes: The figure shows smoothed time-series plots, reporting on the development of female population share for all NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

Figure A.5: Industry Share Agriculture in GVA—Regional Variation Within STRING

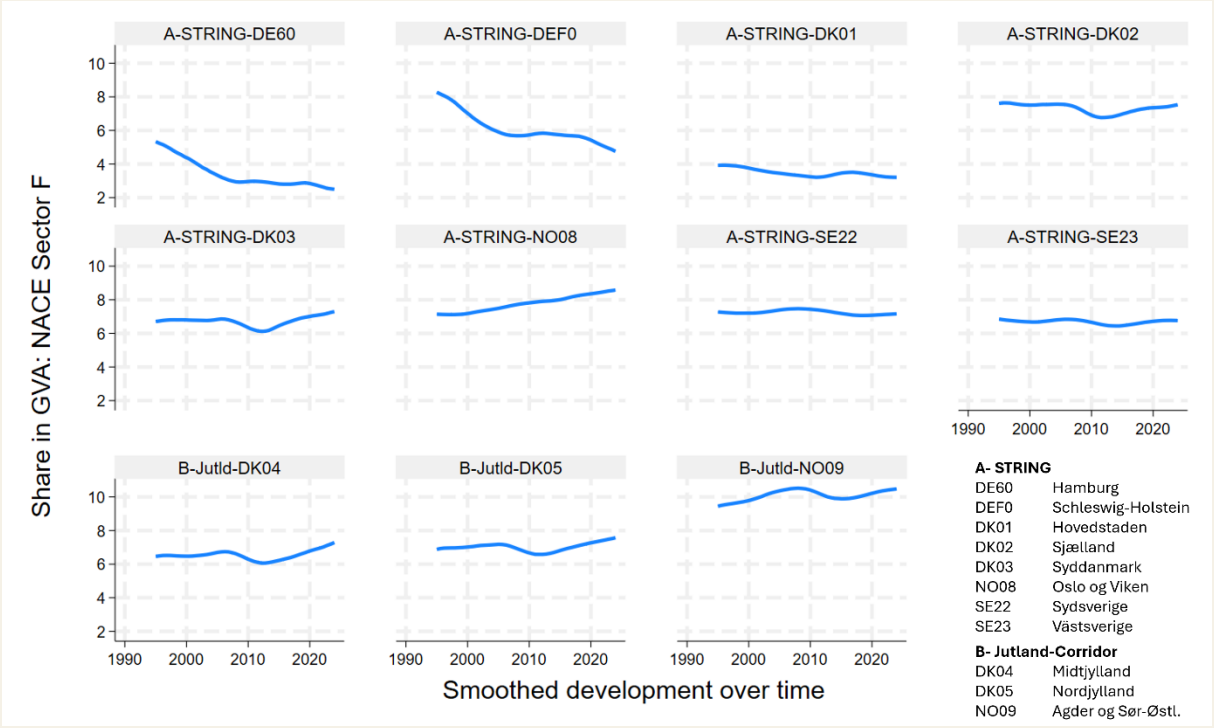
Notes: The figure shows smoothed time-series plots, reporting on the development of the share of agriculture (NACE Sector A) in Gross value added (GVA) in the NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

Figure A.6: Industry Share Manufacturing in GVA—Regional Variation Within STRING



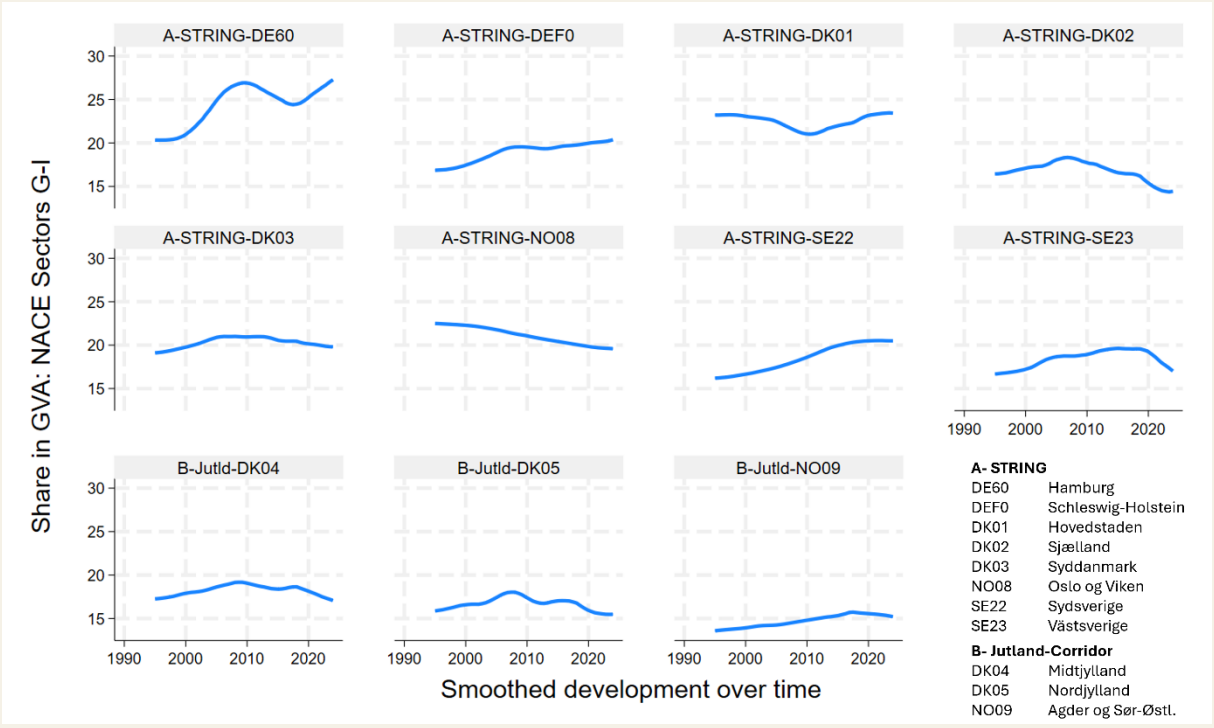
Notes: The figure shows smoothed time-series plots, reporting on the development of the share of manufacturing (NACE Sectors B–E) in Gross value added (GVA) in the NUTS2-Regions contained in STRING (label A) or the Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

Figure A.7: Industry Share Construction in GVA—Regional Variation Within STRING



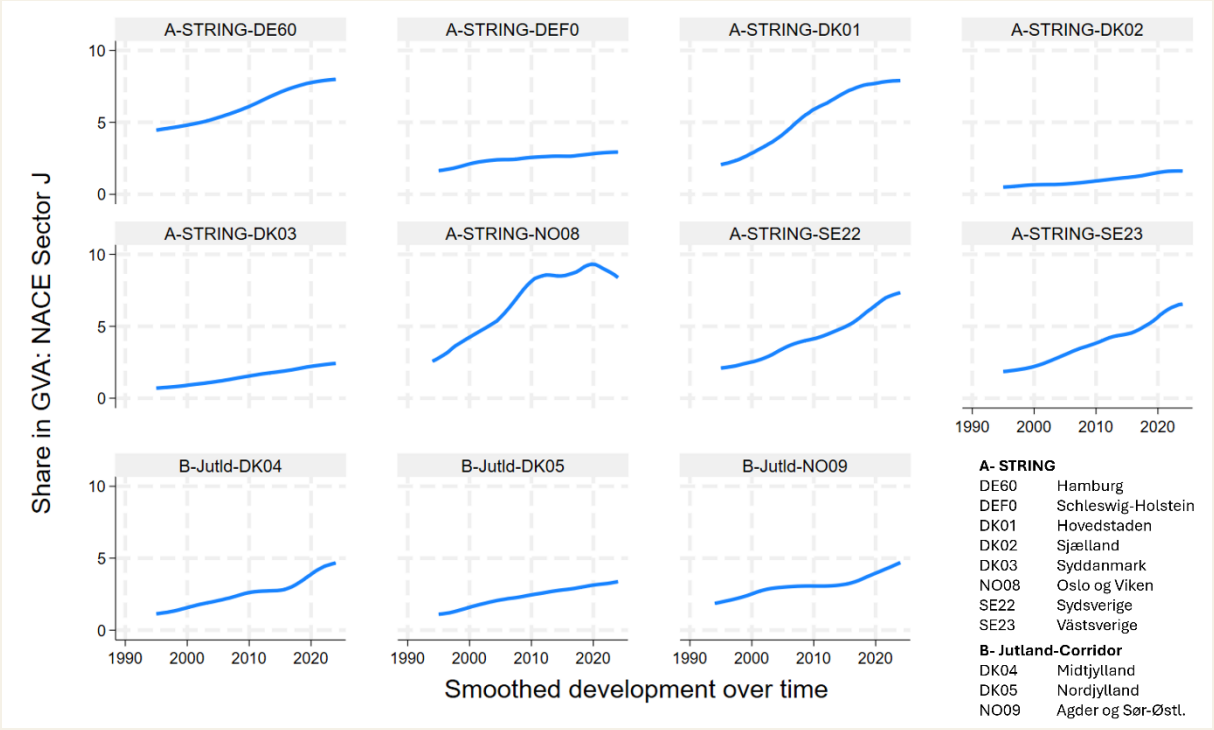
Notes: The figure shows smoothed time-series plots, reporting on the development of the share of construction (NACE Sector F) in Gross value added (GVA) in the NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

Figure A.8: Industry Share Trade & Transport in GVA—Regional Variation Within STRING



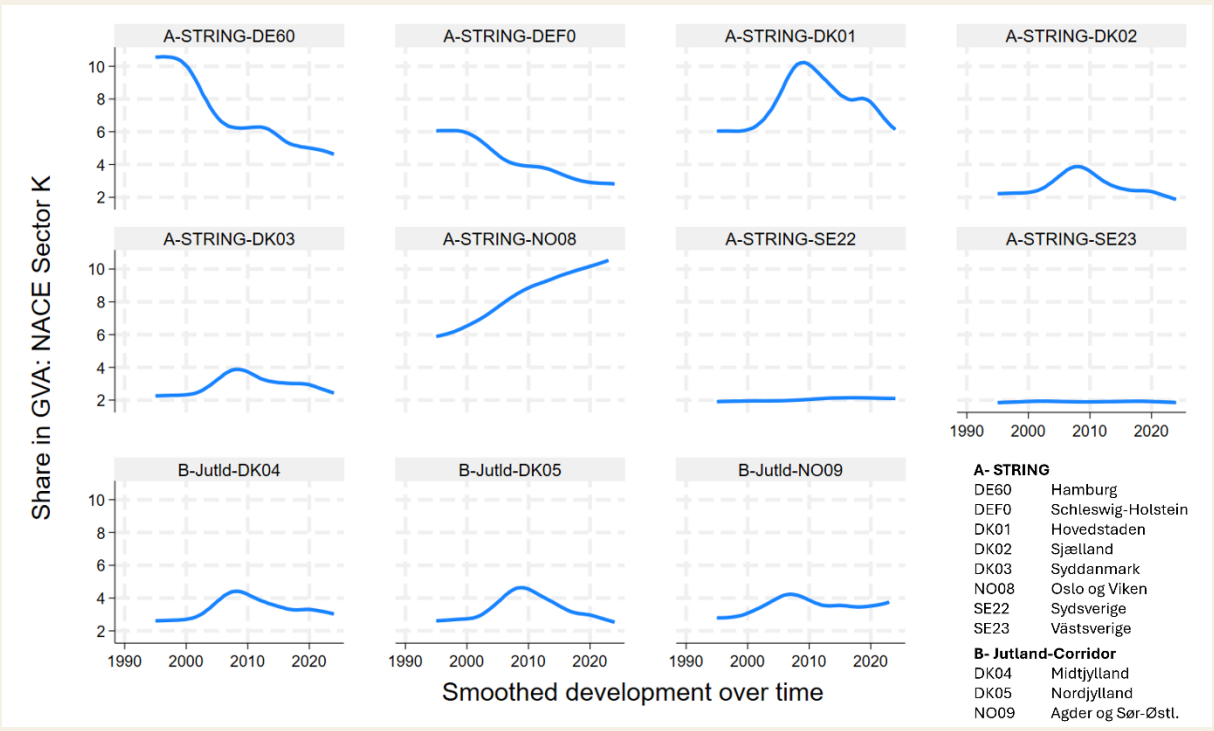
Notes: The figure shows smoothed time-series plots, reporting on the development of the share of Trade and Transport (NACE Sectors G–I) in Gross value added (GVA) in the NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

Figure A.9: Industry Share ICT in GVA—Regional Variation Within STRING



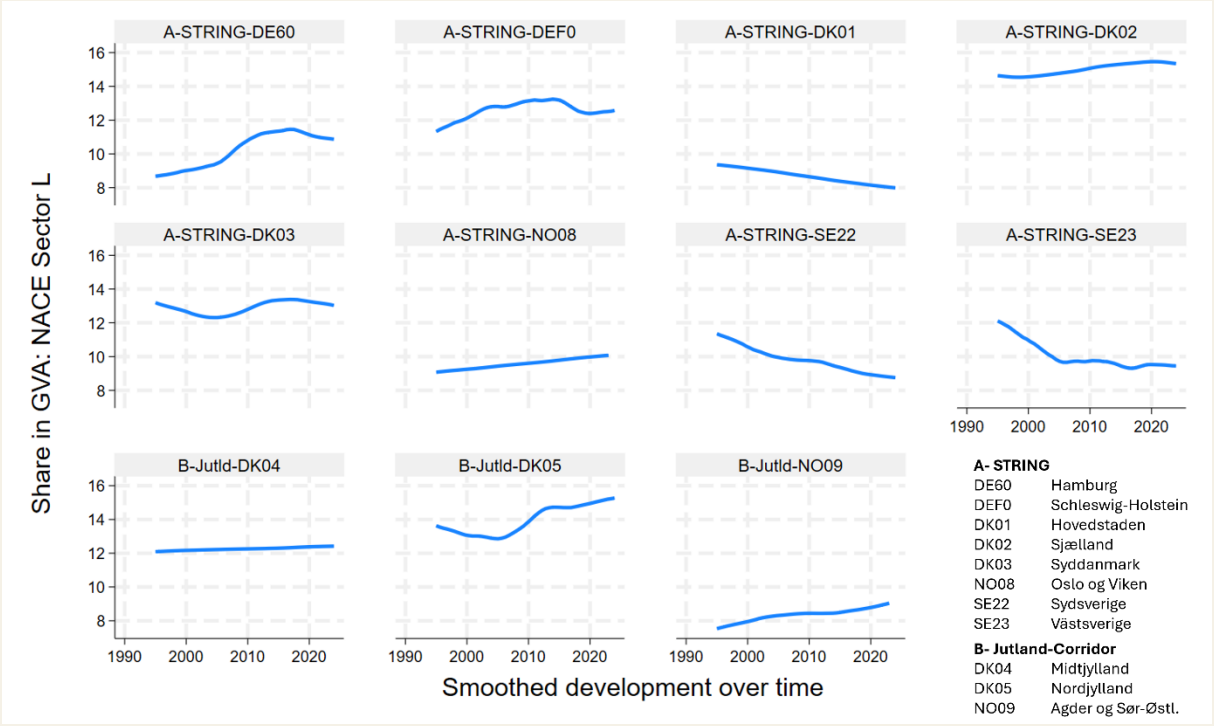
Notes: The figure shows smoothed time-series plots, reporting on the development of the share of Information and Communication Technologies. (ICT, NACE Sector J) in gross value added (GVA) in the NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

Figure A.10: Industry Share Financial Services in GVA—Regional Variation Within STRING



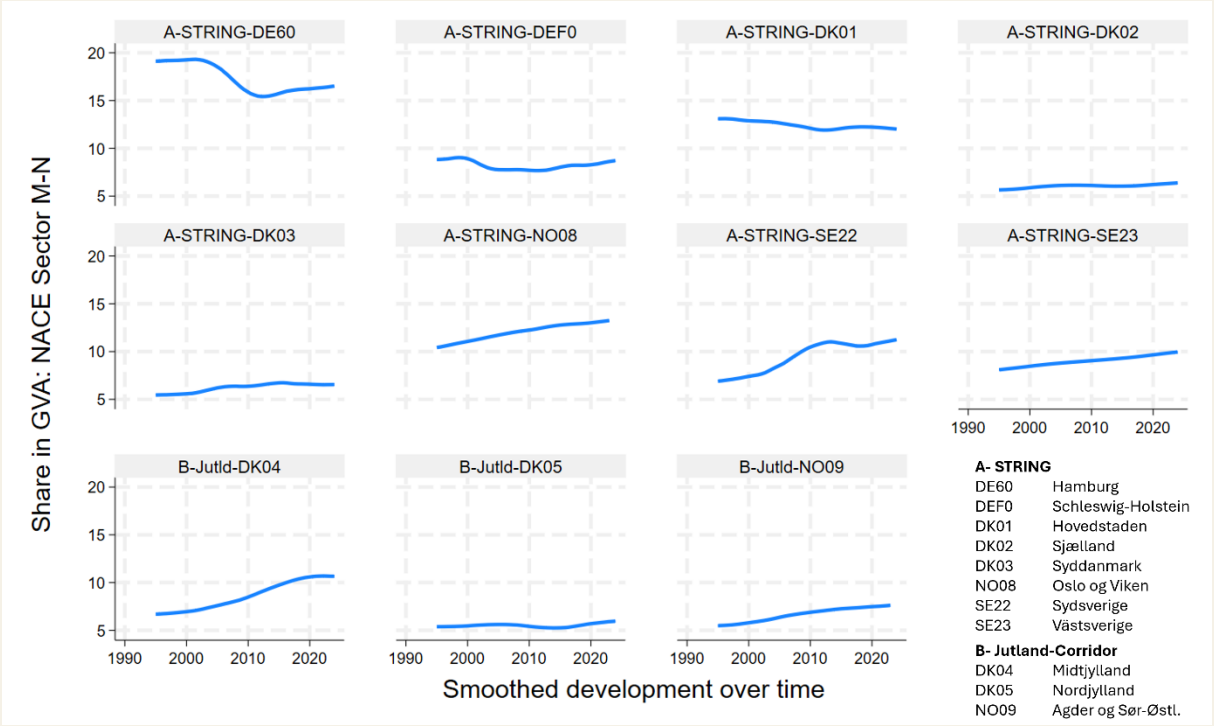
Notes: The figure shows smoothed time-series plots, reporting on the development of the share of I Financial and Insurance Activities (NACE Sector K) in gross value added (GVA) in the NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

Figure A.11: Industry Share Real Estate in GVA—Regional Variation Within STRING



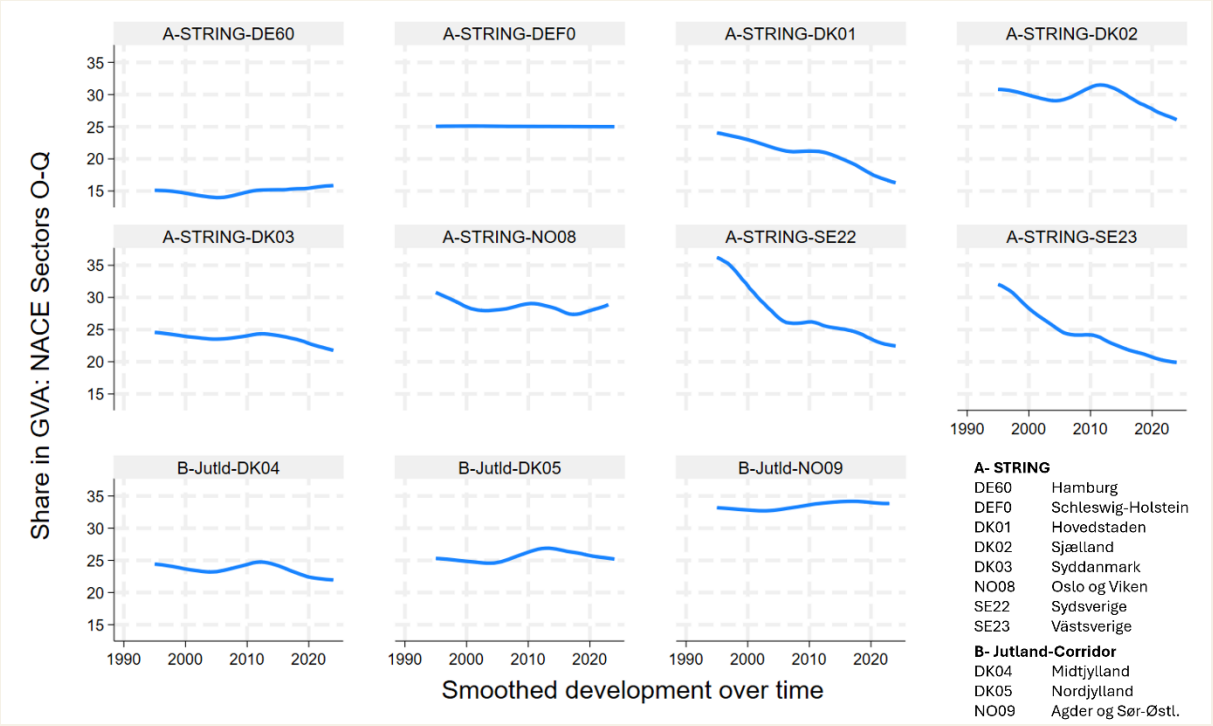
Notes: The figure shows smoothed time-series plots, reporting on the development of the share of Real Estate Activities (NACE Sector L) in gross value added (GVA) in the NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

Figure A.12: Industry Share Skilled Services in GVA—Regional Variation Within STRING



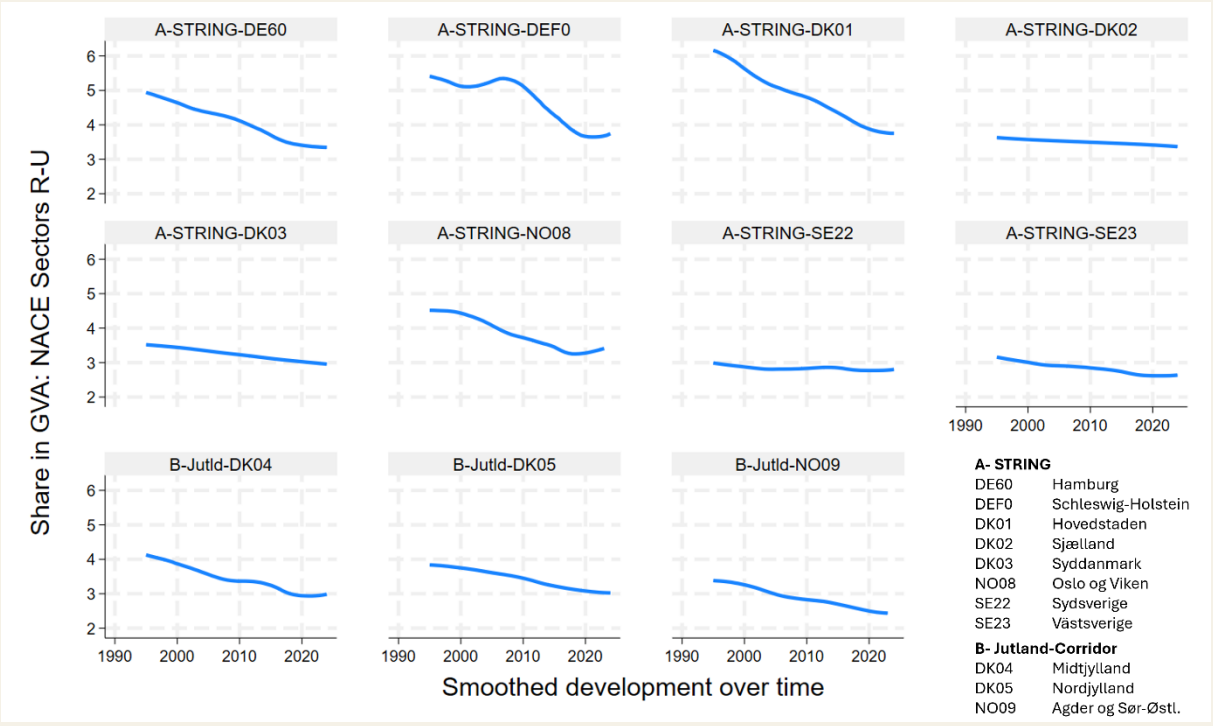
Notes: The figure shows smoothed time-series plots, reporting on the development of the share of Skilled Services (Nace Sectors M–N) in gross value added (GVA) in the NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

Figure A.13: Industry Share Public Services in GVA—Regional Variation Within STRING



Notes: The figure shows smoothed time-series plots, reporting on the development of the share of Public Services (Nace Sectors O–Q) in gross value added (GVA) in the NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

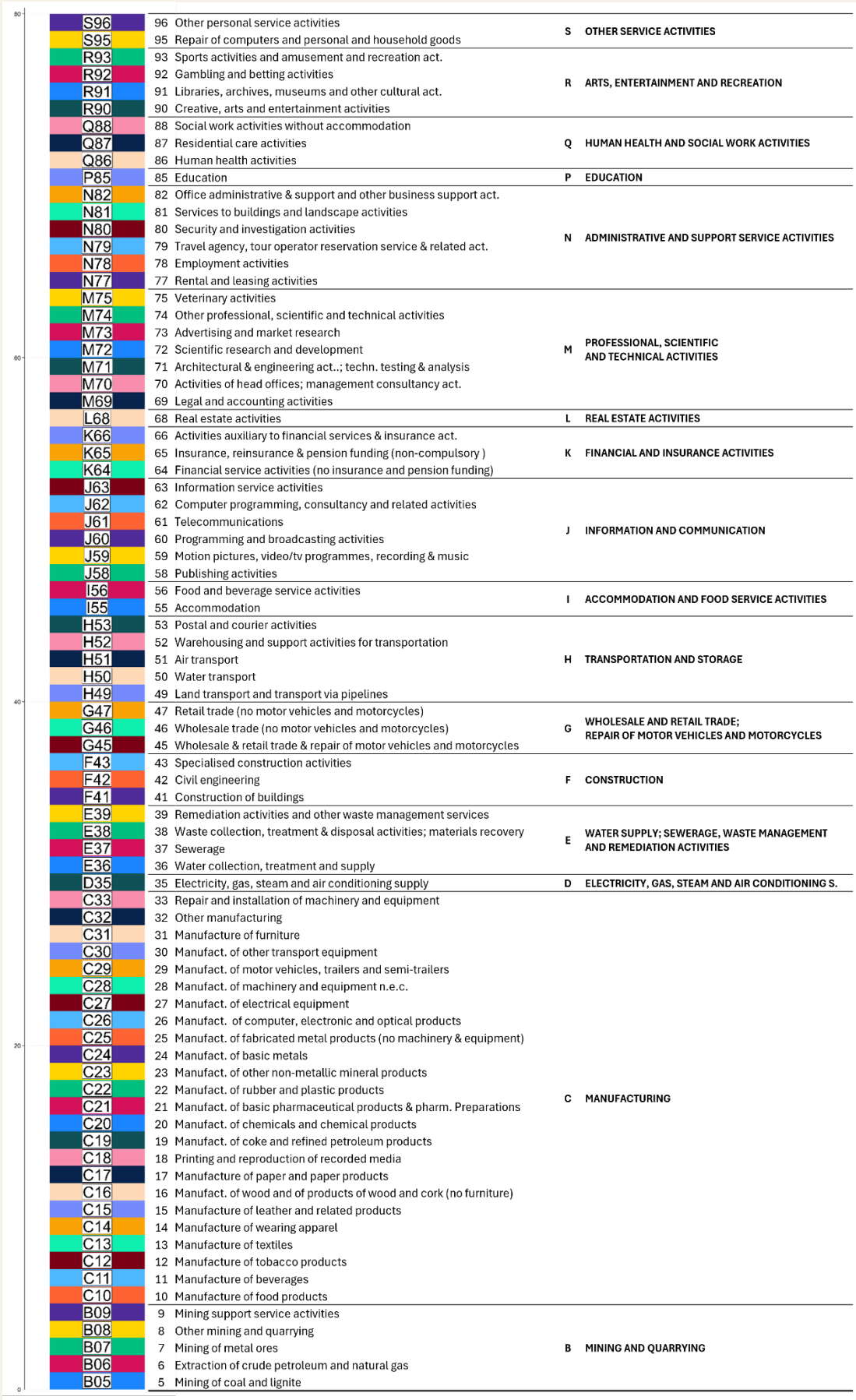
Figure A.14: Industry Share Entertainment and Household Services in GVA—Regional Variation Within STRING



Notes: The figure shows smoothed time-series plots, reporting on the development of the share of Entertainment and Household Services (Nace Sectors R–U) in gross value added (GVA) in the NUTS2-Regions contained in STRING (label A) or the Green Jutland Corridor (label B). Source: Eurostat/ARDECO, own illustration and calculations.

B. Legends and Descriptions

Figure B.1: NACE Categories 2-Digit and Corresponding Color Codes



S96	96	Other personal service activities	S OTHER SERVICE ACTIVITIES
S95	95	Repair of computers and personal and household goods	
R93	93	Sports activities and amusement and recreation act.	R ARTS, ENTERTAINMENT AND RECREATION
R92	92	Gambling and betting activities	
R91	91	Libraries, archives, museums and other cultural act.	
R90	90	Creative, arts and entertainment activities	
Q88	88	Social work activities without accommodation	Q HUMAN HEALTH AND SOCIAL WORK ACTIVITIES
Q87	87	Residential care activities	
Q86	86	Human health activities	
P85	85	Education	P EDUCATION
N82	82	Office administrative & support and other business support act.	N ADMINISTRATIVE AND SUPPORT SERVICE ACTIVITIES
N81	81	Services to buildings and landscape activities	
N80	80	Security and investigation activities	
N79	79	Travel agency, tour operator reservation service & related act.	
N78	78	Employment activities	
N77	77	Rental and leasing activities	
M75	75	Veterinary activities	M PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES
M74	74	Other professional, scientific and technical activities	
M73	73	Advertising and market research	
M72	72	Scientific research and development	
M71	71	Architectural & engineering act..; techn. testing & analysis	
M70	70	Activities of head offices; management consultancy act.	
M69	69	Legal and accounting activities	
L68	68	Real estate activities	L REAL ESTATE ACTIVITIES
K66	66	Activities auxiliary to financial services & insurance act.	K FINANCIAL AND INSURANCE ACTIVITIES
K65	65	Insurance, reinsurance & pension funding (non-compulsory)	
K64	64	Financial service activities (no insurance and pension funding)	
J63	63	Information service activities	J INFORMATION AND COMMUNICATION
J62	62	Computer programming, consultancy and related activities	
J61	61	Telecommunications	
J60	60	Programming and broadcasting activities	
J59	59	Motion pictures, video/tv programmes, recording & music	
J58	58	Publishing activities	
I56	56	Food and beverage service activities	I ACCOMMODATION AND FOOD SERVICE ACTIVITIES
I55	55	Accommodation	
H53	53	Postal and courier activities	H TRANSPORTATION AND STORAGE
H52	52	Warehousing and support activities for transportation	
H51	51	Air transport	
H50	50	Water transport	
H49	49	Land transport and transport via pipelines	
G47	47	Retail trade (no motor vehicles and motorcycles)	G WHOLESALE AND RETAIL TRADE; REPAIR OF MOTOR VEHICLES AND MOTORCYCLES
G46	46	Wholesale trade (no motor vehicles and motorcycles)	
G45	45	Wholesale & retail trade & repair of motor vehicles and motorcycles	
F43	43	Specialised construction activities	F CONSTRUCTION
F42	42	Civil engineering	
F41	41	Construction of buildings	
E39	39	Remediation activities and other waste management services	E WATER SUPPLY; SEWERAGE, WASTE MANAGEMENT AND REMEDIATION ACTIVITIES
E38	38	Waste collection, treatment & disposal activities; materials recovery	
E37	37	Sewerage	
E36	36	Water collection, treatment and supply	
D35	35	Electricity, gas, steam and air conditioning supply	D ELECTRICITY, GAS, STEAM AND AIR CONDITIONING S.
C33	33	Repair and installation of machinery and equipment	C MANUFACTURING
C32	32	Other manufacturing	
C31	31	Manufacture of furniture	
C30	30	Manufact. of other transport equipment	
C29	29	Manufact. of motor vehicles, trailers and semi-trailers	
C28	28	Manufact. of machinery and equipment n.e.c.	
C27	27	Manufact. of electrical equipment	
C26	26	Manufact. of computer, electronic and optical products	
C25	25	Manufact. of fabricated metal products (no machinery & equipment)	
C24	24	Manufact. of basic metals	
C23	23	Manufact. of other non-metallic mineral products	
C22	22	Manufact. of rubber and plastic products	
C21	21	Manufact. of basic pharmaceutical products & pharm. Preparations	
C20	20	Manufact. of chemicals and chemical products	
C19	19	Manufact. of coke and refined petroleum products	
C18	18	Printing and reproduction of recorded media	
C17	17	Manufacture of paper and paper products	
C16	16	Manufact. of wood and of products of wood and cork (no furniture)	
C15	15	Manufacture of leather and related products	
C14	14	Manufacture of wearing apparel	
C13	13	Manufacture of textiles	
C12	12	Manufacture of tobacco products	
C11	11	Manufacture of beverages	
C10	10	Manufacture of food products	
B09	9	Mining support service activities	B MINING AND QUARRYING
B08	8	Other mining and quarrying	
B07	7	Mining of metal ores	
B06	6	Extraction of crude petroleum and natural gas	
B05	5	Mining of coal and lignite	

C. Synopsis Fehmarn Belt Fixed Link—Overview of Study Results

Synopsis on the Economic Effects of the Fehmarn Belt Fixed Link (FBFL) in the STRING-Region: A Literature Review

	Growth	Transportation Time and Costs	Accessibility	Competitiveness	Innovation, R&D, Exchange of Knowledge	Tourism	Relocation of Port Handling	Business establishments and relocation	Commuter Traffic	Resident Population/ Housing
Germany										
Hamburg	(plus) 43 m € estimated annual increase in exports and 37 m € in imports (Rb 2023: 37); '(plus) 11p.c. share of the economic benefit due to increased competition and increased productivity from FBFL (CP 2004: 8); (plus) (CP 2006: 59); (plus) (ML 2011: 4)	(plus) 8 m € annual reduction in transport costs (Rb 2023: 34); (plus) 120 min (in 2.5h) from Hamburg to Copenhagen by train (FBC 2016: 6)	(plus) (FBC 2016: 6), (plus) 140 km less between Hamburg and Copenhagen compared to Jutland route (FBC 2016: 9); (plus) to Scandinavian market (M L 2011: 10)		(plus) (FBC 2016: 8); (plus) (ML 2011: 12–13); (plus) in KIBS (Rb 2023: 99 pp); (plus) (Rb 2023: 13)	(plus) demand potential through better accessibility: increased by 47.757 danish residents (HL 2023:8)			(plus) between 60 m € and 242 m € annual GVA (gross value added) gain through commuters (Rb 2023: 81); '(plus) 3,400 additional commuters are expected to commute to Hamburg from Lübeck, Ostholstein and the Danish regions (Rb 2023: 71); (plus) from Ostholstein (CP 2006: 59)	(plus) in real estate prices (CP 2006: 59); '(minus) relocation to Northern German Areas near the Link (ML 2011: 9)
Schleswig-Holstein	(plus) 21 m € estimated annual increase in exports and 18 m € in imports (Rb 2023: 37) '(plus) 9p.c. share of economic benefit due to increased competition and increased productivity from FBFL (CP 2004: 8), (plus) (ML 2011: 4)	(plus) 4 m € annual reduction in transport costs (Rb 2023: 34); (plus) reduction of transport costs to Eastern Denmark by 8.9p.c. and by 5.6p.c. to Southern Sweden (CP 2004: 26); (plus) time savings tunnel compared to ferries: passenger cars: 63min, buses: 48min, lorries: 54min (Inc 2015: 18)	(plus) (CP 2004: 22); (plus) (FBC 2016: 6); (plus) to Scandinavian markets (ML 2011: 10)	(plus) (CP 2004: 17)	(plus) for universities and research institutions (FBC 2016: 8); (plus) (ML 2011: 12–13); (plus) in KIBS (Rb 2023: 99pp)	(plus) for Baltic Rim Region in SH from Sweden and Denmark (NIT 2017: 21); (plus) (CP 2004: 5); (plus) (FBC 2016: 8)		(plus) 500–600 work places during construction (FBC 2016: 10); (minus) job losses in Ostholstein due to reduced ferry operation (ML 2011:9)	(plus) (CP 2004: 5); (plus) increase of commuters from Ostholstein to Denmark (ML 2011:9)	(plus) 8p.c. increase in the price of average house (on German side of FBFL) (ML 2011: 9); (plus) relocation from Hamburg (ML 2011: 9)
Kiel	(plus) economic benefit due to increased competition and increased productivity from FBFL about 4 times as high as regional share of German GDP (CP 2004: 8), (plus) growth potential (ML 2011: 9)		(plus) (FBC 2016: 6)		(plus) (FBC 2016:8); (plus) (ML 2011: 12–13)	(plus) small increase in overnight and day tourism, (plus) 306 K € expected revenue (NIT 2017: 35pp), (plus) 0,4p.c. increase in volume in overnight trips and (plus) 6.7p.c. increase in volume in overnight trips from DK and SE (NIT 2017: 37)	(minus) maximum loss in volume: 443 K t (trade to Sweden) (NBS 2021: 9); (minus) development in ferry services (ML 2011: 9)			

continued

	Growth	Transportation Time and Costs	Accessibility	Competitiveness	Innovation, R&D, Exchange of Knowledge	Tourism	Relocation of Port Handling	Business establishments and relocation	Commuter Traffic	Resident Population/ Housing
(Lübeck)	(plus) economic benefit due to increased competition and increased productivity from FBFL about 4 times as high as regional share of German GDP (CP 2004: 8), (plus) growth potential (ML 2011: 9)		(plus) (FBC 2016: 6); (plus) for enterprises in Lübeck; port benefits from hinterland connection (HL 2023: 64)	(plus) for enterprises in Lübeck (HL 2023: 64)	(plus) (FBC 2016: 8); (plus) (ML 2011: 12–13); (plus) between Lübeck and Öresund-Region due to similar clusters (HL 2023: 68)	(plus) 351.505 demand potential from denmark (HL 2023: 8); (plus) from Denmark and Skandinavia (CIMA 2020: 59p); (plus) high increase in overnight and day tourism, (plus) 2126 K € expected revenue (NIT 2017: 35pp), (plus) from Denmark and other Skandinavia (HL 2023: 68); (plus) 2.220.000 € expected revenue gain from Denmark and Sweden, highest revenue in short holiday trip (1.410.000€) and day trips (528.000€) (HTC 2024: 41)	(minus) maximum loss in volume: 2670 K t, or when establishment of nordic junction: only 230 K. t (NBS 2021: 9); (minus) development in ferry services (ML 2011: 9) (plus) 2p.c. annual growth of turnover without additional shipping to Russia/ Baltic States when FBFL is fully integrated in infrastructure (HL 2023: 72)	(plus) enterprises (HTC 2024: 16)	: (plus) between 29 mand 117 m € annual gross value-added gain through commuters (with Ostholstein) (Rb 2023: 81): (plus) 1,600 additional commuters (with Ostholstein) (Rb 2023: 71)	
Denmark	(plus) 17p.c. of the economic benefit due to increased competition and increased productivity by FBFL (CP 2004: 23); (plus) 28 bn DKK net social benefit over 50 years, (plus) 5,4p.c. internal rate of return (Inc 2015: 4), (plus) (ML 2011: 4)	(plus) time benefits for road traffic: bn DKK 10.8 over 50 years (2014 prices) (Inc 2015: 19); (plus) time savings tunnel compared to ferries: Passenger cars: 63min, Buses: 48min, Lorries: 54min (Inc 2015: 18)					(plus) 3000 work places during construction (FBC 2016: 10); (plus) 1,8 bn DKK (2014 prices) labor supply benefit over 50 years (Inc 2015: 22) (minus) loss of jobs in ferry operations (ML 2011: 9)			
Region of Sjælland	(plus) (for Region Lolland-Falster) share of economic benefit due to increased competition and increased productivity from FBFL exceeding its share of Danish GDP by more than factor 4 (CP 2004: 8); growth effect: 0,15p.c. of regional GDP (CP 2004: 22); (plus) 81 m € estimated annual increase in exports and 73 m € in imports (Rb 2023: 37)	(plus) 14 M € annual reduction in transport costs (Rb 2023: 34); (plus) Reduction of transport costs to Northern Germany by 8,9p.c. (CP 2004: 26); 1,5h to Hamburg and Copenhagen (CP 2006: 4)	(plus) (CP 2004: 22); (plus) (FBC 2016: 6); (plus) to German market (ML 2011: 10)	(plus) (CP 2004: 17)	(plus) (FBC 2016: 8); (plus) (ML 2011: 12–13)	(plus) from Germany (CIMA 2020: 60); (plus) (CP 2004: 5); (plus) (FBC 2016: 8)			(plus) between 44 m € and 175 m € annual gross value-added gain through commuters (Rb 2023: 81); (plus) 500 additional German commuters and 1,600 Danish commuters (Rb 2023: 71); (plus) (CP 2004: 5); (plus) increase in residents working in Hamburg or Copenhagen (CP 2006: 59)	(plus) increase in house prices (ML 2011: 9); '(plus) relocation from Greater Copenhagen (ML 2011: 9)

continued

	Growth	Transportation Time and Costs	Accessibility	Competitiveness	Innovation, R&D, Exchange of Knowledge	Tourism	Relocation of Port Handling	Business establishments and relocation	Commuter Traffic	Resident Population/ Housing
Capital Region (DK)	(plus) 230 m € estimated annual increase in exports and 206 m € in imports (Rb 2023: 37)	(minus) 41 m € annual reduction in transport costs (Rb 2023: 34)			(plus) increase in knowledge intensive business sectors (Rb 2023: 99–102)				(plus) between 27 m € and 108 m € annual gross value added gain through commuters (Rb 2023: 81)'(plus) 900 additional German commuters and 450 Danish commuters (Rb 2023: 71)	(minus) relocation to Danish Areas near the Link (ML 2011: 9)
City of Copenhagen	(plus) (CP 2006: 59)	(plus) 120min (in 2.5h) from Hamburg to Copenhagen by train (FBC 2016: 6)	(plus) (FBC 2016: 6)		(plus) (FBC 2016: 8); (plus) (Rb 2023: 13)	(plus) (FBC 2016: 8)			(plus) from Region of Sjælland (former Storstroms Amt) and Ostholstein (CP 2006: 59 & 65)	(plus) in real estate prices (CP 2006: 59)
Sweden										
Region of Skåne	(plus) 30 m € estimated annual increase in exports and 29 m € in imports (Rb 2023: 37); (plus) 16p.c. of total welfare gain (for Southern Sweden), twice the region's share of national GDP (CP 2004: 23)	(plus) 6 M € annual reduction in transport costs (Rb 2023: 34); (plus) Reduction of transport costs from Southern Sweden to Northern Germany by 5.6p.c. (CP 2004: 26)	(plus) (CP 2004: 22); (plus) to German market (ML 2011: 10)	(plus) (CP 2004: 17)	(plus) (FBC 2016: 8); (plus) (ML 2011: 12–13); (plus) in KIBS (Rb 2023: 99pp)	(plus) (CP 2004: 5); (plus) (FBC 2016: 8)			(plus) (CP 2004: 5)	
City of Malmö			(plus) (FBC 2016: 6)		(plus) (Rb 2023: 13)					
City of Helsingborg										
Region of Västra Götaland	(plus) 81 m € estimated annual increase in exports and 78 m € in imports (with Halland) (Rb 2023: 37)	(plus) 15 M € annual reduction in transport costs (includes Halland) (Rb 2023: 34)								
City of Gothenborg										
Region of Halland	*(plus) 81 m € estimated annual increase in exports and 78 m € in imports (with Västra Götaland) (Rb 2023: 37)*	*((plus) 15 M € annual reduction in transport costs (includes Västra Götaland) (Rb 2023: 34))*								

continued

	Growth	Transportation Time and Costs	Accessibility	Competitiveness	Innovation, R&D, Exchange of Knowledge	Tourism	Relocation of Port Handling	Business establishments and relocation	Commuter Traffic	Resident Population/ Housing
Norway										
City of Oslo	(plus) 6 m € estimated annual increase in exports and 6 m € in imports (including Viken county) (Rb 2023: 37); '(plus) (CP 2004: 24)	(plus) 1 m € annual reduction in transport costs (includes Viken county) (Rb 2023: 34)								
Region of Viken	(plus) 6 m € estimated annual increase in exports and 6 m € in imports (including Oslo) (Rb 2023: 37)	(plus) 1 m € annual reduction in transport costs (includes Oslo) (Rb 2023: 34)								
Akershus										
Østfold										
All STRING Region	(plus) 0.3 to 0.6 billion € expected due to increase in productivity and competitiveness (CP 2004: 5); (plus) 40,5 M € annual short time welfare gain (CP 2004: 18); 49,5 M € annual long-term welfare gain (CP 2004: 19); 5 p.c. return in 50 years, '(plus) 26 BN DKK net social benefit (Inc 2015: 4)	(plus) 1,6 p.c. reduction in transport costs between Germany and Nordic countries (CP 2004: 19) (plus) time saving: 45min for cars (FBC 2016: 6) (plus) overall time benefits for road traffic: bn DKK 34.3 over 50 years (2014 prices) (Inc 2015: 19) (plus) 2.5h time saving for freight trains equals a reduction of 5–10 p.c. of transport costs in transport chains lasting 24 to 48h (Sweco 2023: 5); (plus) 60min time saving for trucks (Sweco 2023: 44)	(plus) for regions close to the link (minus) for regions farther away relative to regions close to Link (CP 2004: 24)	(neutral) since time saving of 2.5h = reduction of 5–10 p.c. for transport chains lasting 24 to 48h might not be enough to improve competitiveness (Sweco 2023:5)					

Plus = positive effect | Minus = negative effect | slightly negative | strongly negative | slightly positive | strongly positive

Source: CIMA (2020), CP (2004), CP (2006), FBC (2016), HTC (2024), HL (2023), Inc (2015), ML (2011), NIT (2017), NBS (2021), Rb (2023), Sweco (2023); own compilation.

D. Info Box EGTC—European Grouping for Territorial Cooperation

Box 1: Characteristics of the "European Grouping of Territorial Cooperation" (EGTC)

- Legal structure: The EGTC has its own legal personality and is comparable to a cross-border association for the fulfillment of specific (public) tasks.
- Objective: The EGTC legal form was introduced in 2006 as an "instrument of cooperation at Community level" to overcome obstacles to territorial cooperation and facilitate cross-border, transnational, and/or interregional cooperation between members.
- Composition of the EGTC: An EGTC consists of members from at least two member states. Potential members include, in addition to the EU member states themselves, regional or local authorities (in Germany: federal states, independent cities, counties, and municipalities); associations of the above-mentioned legal entities; and public-law institutions that perform non-commercial tasks in the public interest, have legal personality, are predominantly publicly funded, and are publicly managed or supervised. Examples in Germany include scientific universities, business associations, cultural or educational institutions, and institutions for the promotion of science and business. Since 2013, national authorities and companies that provide services of general economic interest, as well as members from third countries under certain conditions, have also been eligible for membership. Private individuals are excluded.
- Bodies of the EGTC (Art. 10 EGTC Regulation): An EGTC has at least one assembly (consisting of representatives of the members) and a director (who represents the EGTC and acts on its behalf). In addition, other bodies with precisely defined tasks may be appointed. The powers of the organs and the decision-making and resolution-passing procedures are laid down in the EGTC's statutes.
- Tasks of the EGTC (Art. 7 EGTC Regulation): The EGTC carries out the tasks assigned to it by its members and laid down in an agreement. Possible tasks include, for example, powers to implement joint projects, tasks in the field of spatial planning coordination, or simply the exchange of expertise. Specifically, the tasks of the EGTC are primarily limited to the implementation of programs or projects for territorial cooperation co-financed by the EU (in particular through the ERDF, ESF, or Cohesion Fund). The EGTC may also carry out specific measures of territorial cooperation between its members, including those financed at the national level. Member States may restrict the tasks without EU financing.
- Powers: The powers of the EGTC are limited by the respective powers of its members. Sovereign powers, such as political decision-making or regulatory powers, cannot be transferred to an EGTC.
- Legal basis: EU law. The EGTC itself is governed by the EGTC Regulation and its own statutes, as well as by the law of the Member State in which the EGTC has its registered office.

Source: DStGB (2010), EU (2006, 2013); own compilation.

KIEL INSTITUTE FOR THE WORLD ECONOMY
Kiel Institut für Weltwirtschaft

Kiellinie 66 | 24105 Kiel, Germany
Chausseestraße 111 | 10115 Berlin, Germany

linkedin / X / bluesky / facebook / youtube

kielinstitut.de