NIFU

INSIGHT | NO. 2 – 2018

Policy Brief - FORINNPOL

Regional policy development based on new research directions

Marco Capasso, Eric James Iversen, Antje Klitkou, Tore Sandven

Addressing climate change is one of the grand societal challenges of our time. It requires a concerted effort of innovation, industrial and environmental policy. In order to achieve green restructuring at regional level, policy has to set the direction for the restructuring processes. In our project, we have explored research avenues that can help policymakers assess regional capabilities for "green" economic restructuring. A full report, describing our research results in detail, can be downloaded from NIFU's homepage (NIFU Report 2018:18). In our study, we have tried to harmonize results from the innovation studies literature within the framework of the economic geography studies. This policy brief summarises our research results for a broader audience.

Norway has a long-term aim to diversify from the dominant and mature (if not yet declining) petroleum industry, and to find ways to leverage national capabilities and resources into emerging industries that are growing up around renewable energy systems and the circular bioeconomy. In our research, we have developed an approach that can help direct policy attention as it pursues this aim. We have used information on past labour flows and international trade transactions to identify potential complementarities between related industrial structures at the regional level. The approach is aimed to support and inform policy development in this context.

Policymakers face a range of difficulties as they seek to prioritize long-term and innovative solutions, necessary to address 'social challenges' such as climate change and access to renewable energy. Policymakers need a theoretically grounded and empirically robust way to develop smart specialisation strategies and to direct public policy interventions. New statistical devices are needed to help policymakers assess the potential for regions to move into industries that can develop around renewable energy systems and the circular bioeconomy.

The OECD indicates that the smart specialisation framework assumes that public policy has at its disposal three types of capabilities, namely:

- the capacity to identify local strengths;
- the ability to align policy actions and to build critical mass; and
- the ability of regions to develop a vision and implement the strategy.

It further emphasises the importance of a "diagnostic system" to analyse the match between technological and economic performance.

Research approach

We use network analysis to analyse the regional economies and to infer possible knowledge flows across sectors within the regions. Local knowledge flows represent "intangible" input-output relations, also in the form of externalities. The economic and industrial composition of a region can be represented as a network, where the elements of the network are the different industry sectors and can be connected by

knowledge flows. The position in such a network determines a sector's innovative activity and growth. In our study, knowledge flows between industry sectors are inferred from data on past labour flows. Labour flows can be used to define skill-based relations between economic sectors.

On the other hand, the trade literature provides an important avenue for understanding "tangible" input-output relations in regional economic restructuring, an avenue which has not yet been sufficiently exploited. In general, the literature indicates that trade patterns engender a range of factor endowment, from traditional tangible measures of "capital" (including machinery and tools) to "intangible" factors like skills and institutions, which are part of a location's endowment. In our procedure, we show the potential of international trade firm-level data for understanding input-output relations in a policy-relevant sector. The formation of local value chains could indeed result from industrial policies which, informed on the past international transactions of firms in an emerging sector, bring to the local level input-output connections that have previously been international.

Smart specialisation strategies have the aim to strengthen the regional economy, but the question is how to define the direction of such strategies. There is a risk that such strategies end up enforcing current lock-ins and do not exploit possibilities for economic restructuring and overcoming path-dependencies.

Our first research question is therefore: which sector would most benefit each region? As a research approach, we have chosen the following starting point: we identify possible structural gaps of a regional economic structure. Such structural gaps can be pointed out by combining three types of information: (a) information about the economic structure of the region, (b) information about national labour flows between all industry sectors, and (c) information about international trade in all industry products. As a result, we can identify industry sectors which are not already present in a region, but which could bridge very well in terms of existing skill relations and of local value chains. That means we can show which industries, new to the region, would best fit the existing industrial composition of the region. Then, by allowing for the direction of the knowledge flows between economic sectors, we can show whether the new industries would only profit from the existing sectors in the region or if they would also contribute to strengthen them.

A second research question is: when is the introduction of a new sector the best strategic choice? As a direction for further research, we suggest applying a dynamic approach, which takes into account not only the network structure of the sectors, but also the current growth or decline of each neighbouring economic sector and how gradually knowledge can spread between them.

Green restructuring

Green restructuring is an essential element of sustainability transitions. It requires transformation processes across the entire innovation chain: on the supply side through investments in innovation and demonstration activities, and on the demand side through public procurement policies and policies that change consumption and investment patterns. Policy has to set the direction of the restructuring processes, going much further than the traditional policies for market failure fixing.

A definition of a "green economy" has to be a combination of different economic activities, and we thus specifically draw the attention on some key sectors of the Norwegian economy: renewable energy, sustainable road transport solutions, and urban waste management.

The "green restructuring" of the Norwegian economy requires a prioritisation of specific directions of innovation towards turning the fossil-based economy into a circular and 'green' economy, through a valorisation of the appropriate skills and resources present at firm level as well at regional level. We also advocate a deeper utilization of demand-side policies, including green procurement and induced changes of user needs.

Our research considers the peculiarities of the Norwegian economy and connects them with the international discourse on grand environmental challenges. Topics discussed are renewable energy, including offshore wind, the solar photovoltaic industry, organic waste management and sustainable road transport.

As empirical cases, we provide three examples of how both knowledge flow analyses and other input-output considerations can be combined to help the decision-making processes of policy-makers. In particular, linked employee-employer data from Statistics Norway have been exploited to reconstruct previous knowledge flows and to estimate potential future knowledge flows among sectors. In our first two examples, we assess the potential regional impact of policies targeted at the development of, respectively, biogas production and wind power. Kongsvinger and Gjøvik appear as interesting candidates for the production of biogas, since both are already active in two potential upstream sectors (respectively sewerage and

waste collection, treatment and disposal) as well as in the potential downstream sector «land transport and transport via pipelines». Moreover, in Kongsvinger, biogas production could bring knowledge to other local firms involved in civil engineering or in the manufacture of chemical products.

For what concerns the second example on wind power, instead, our procedure highlights possible knowledge synergies in the area of Molde with other local activities, connected to electrical installation and engineering consultancy. Moreover, in the area of Molde a potential downstream sector, namely "manufacture of other inorganic basic chemicals", is already active whose energy-intensive processes could benefit from a boost in wind energy production.

In the two examples described above, we have derived possible local input-output relations on the basis of the regional industrial composition. In our third example, we pair this information with information from international trade firm-level data from Statistics Norway, which we use to infer strategic inputs for the photovoltaic industry. In four areas of Norway exist local industries involved in production of ferro-alloys, of other non-ferrous metal products, and of electrical equipment. These goods qualify as strategic inputs on the basis of international trade data. The associated industries could provide locally inputs for a policy-supported production of silicon, a main activity in the photovoltaic sector. Kristiansand and Odda, in particular, stand out as two promising areas for a photovoltaic industrial policy. A boost in the chemical sector, connected to a policy-promoted silicon production, could also be strongly beneficial to the knowledge flows between the existing local sectors.

Future steps

There are several possible refinements in the current set up. The knowledge flows can be enriched by a better knowledge of the research and innovation patterns of the industries in which complementary assets are identified. R&D activity, innovation intensity and use of intellectual property rights can be associated with the different activities to better understand the types of employment flows and how they link with the innovation intensity of the different activities. The role of knowledge flows that involve multinational enterprises may also be useful to understand the mechanisms for how knowledge flows may lead to growth paths. A promising data source here is the link between the employment data and the R&D surveys connected to the Community Innovation Survey.

Another suggestion for further research is: in order to choose where to implement an industrial policy, it is worth considering not only where to create local value chains, but also where to connect to existing international value chains. In other words, it would be useful to identify a set of regions that are internationally connected to a strategic input, because of the existing presence of local importers. More in general, the existing international trade in a strategic input, if associated to a particular region, could qualify the same region as a target location for a national industrial policy.

Finally, additional considerations could be drawn on the basis of regional-level maps of natural resources. For instance, maps built on the basis of previous studies about forest localization, sun light availability and wind strength could be used to suggest local supply chains in respectively wood-based, photovoltaic and wind-power industries.

NIFU

Nordisk institutt for studier av innovasjon, forskning og utdanning

Nordic Institute for Studies in Innovation, Research and Education

NIFU is an independent social science research institute, organized as a non-profit foundation. NIFU aims to be a leading European research organization for studies of innovation, research and education at all levels. We collect, analyze and disseminate national statistics and indicators for R&D and innovation, and are active participants in statistical cooperation at European and international levels.

NIFU
PB 2815 Tøyen, NO-0608 Oslo
www.nifu.no | post@nifu.no