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New Dynamics for Europe: Reaping the Benefits of Socio-ecological Transition. Synthesis Report Part II: Model and Area Chapters

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NEW DYNAMICS FOR EUROPE: REAPING THE BENEFITS OF SOCIO-ECOLOGICAL TRANSITION

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Socio-economic Sciences and Humanities
 Europe moving towards a new path of economic growth
 and social development – Collaborative project



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PREFACE

The WWWforEurope Synthesis Report contains two parts. Part I¹ is an overarching synthesis, Part II reports on the results of different models and presents research findings in the five areas which were inputs for the synthesis.

Part II of the WWWforEurope Synthesis Report comprises two distinctive parts and serves a dual purpose.

The first section describes the results of modelling the effects of starting the socio-ecological transition towards a sustainable development path. The models pull together results from the research performed by the various contributors to this project and arrive at the highly remarkable result that (under certain conditions and assumptions) the triple objectives of wellbeing, economic dynamics, social inclusiveness and environmental sustainability can be achieved. Given the tradeoffs and synergies discussed in Part I of this Synthesis Report, the model results show one possible way to achieve the desired transition.

The second section pulls together all the research completed within this project and contains the so-called Area Chapters. These reports were written by the leaders of the five research areas in conjunction with and as summaries of more than 160 research papers organised into the following areas: (1) Challenges for the European welfare state, (2) Analysing policies for a transition to a low-carbon economy, (3) Drivers of change – innovation and industrial policies, (4) Governance structures and institutions at the European level and (5) The role of regions in the European socio-ecological transition. They mirror the work packages according to the WWWforEurope research proposal and form the consolidated backbone of the first part of the synthesis report. Moreover, they contain various connections to the first section of this volume, i.e. the Model Chapter (this is especially true of Area Chapter 2), to which they contribute assumptions and content.

The Area Chapters are attached to this report for the purpose of both substance and documentation. While the final versions have been refereed by the project coordinator (WIFO), they ultimately remain the responsibility of their authors. As a consequence, the structure of the Area Chapters varies.

¹ Aiginger, K., New Dynamics for Europe: Reaping the Benefits of Socio-ecological Transition. Part I: Synthesis, WWWforEurope Synthesis Report, Final Version, Vienna, Brussels, 2016 (download from <http://Synthesis-Report-Part-I.foreurope.eu>).

KEY INFO

- The macroeconomic models developed within the WWWforEurope project aim at simultaneously taking into account the economic, social and environmental dimensions.
- The model simulations examine policy strategies that are necessary for reaching the three main goals defined in the project, i.e. economic dynamics, social inclusiveness and environmental sustainability. These strategies comprise the following combination of instruments: i) environmental tax reform, ii) changing consumption behaviour and iii) boosting innovation and redirecting technical change. Moreover, policies to reduce unemployment and income spread are considered.
- Two different modelling approaches are applied for the model simulations: a family of Post-Keynesian stock-flow consistent models and a multi-industry Dynamic New Keynesian (DYNK) model.
- The simulation results identify tradeoffs and dividends of the policy strategy. The most important identified tradeoff is the one between environmental targets and equity. Another significant tradeoff is that between environmental targets and income dynamics.
- Finally, the possibility of triple dividends is highlighted.

1. MACROECONOMIC MODELS FOR A SOCIO-ECOLOGICAL TRANSITION STRATEGY

Kurt Kratena (WIFO)

1.1 Modelling approaches for policy strategies

Achieving the three main targets of high income per capita and rising incomes, high levels of social inclusiveness, and respecting planetary boundaries makes integrating of different instruments into broad policy strategies necessary. The income target is directly linked to a new concept of competitiveness and has been used to design a 'high road' strategy for Europe (*Aiginger et al., 2013*). Social inclusiveness has as two main aspects: the target of full employment and the target of equality in the distribution of wealth and income. Respecting planetary boundaries requires considerable absolute reduction in energy/resource use and emissions.

These targets can be achieved by policy strategies that combine different instruments. The definition of instruments in this context is very broad and includes different types of environmental tax reform (traditional vs. taxing footprint), supporting directed technical change (more energy/resource, less labour productivity growth), policies aiming at behavioural change in private and public consumption, and policies to reduce unemployment and the income spread. The models developed have been applied for different policy simulations as well as for analysing the consequence of changes in some field (less income growth, less income spread, etc.) on other areas (energy/resource use, income distribution, unemployment, etc.).

The two main modelling approaches comprise (i) a family of Post-Keynesian consistent stock-flow models (macroeconomic, multi-industry and agent based model), and (ii) a multi-industry Dynamic New Keynesian (DYNK) model.

The family of stock-flow consistent macroeconomic models

Jackson et al. (2016) present a family of macroeconomic models, following the accounting framework presented in Godley and Lavoie (2007). The institutional sectors dealt with in this model comprise: production, households, government, the finance sector, the central bank and, in some model versions, an environmental sector. Economic activities are tracked in two monetary accounts, a balance sheet and a transition flow matrix. The balance sheet contains the net worth of the economy across different institutional sectors at the end of each of a time period. Interactions between agents result in flows between two time periods which are summarized in the transition flow matrix. The specification allows for the analysis of income distribution at the level of the two production factors labour and capital. Labour and capital incomes accrue to two different types of households (workers and capital owners). Double entry accounting restrictions imply that all rows and columns of this matrix must add up to zero.

The models are demand-driven and describe the main Keynesian multiplier processes, based on the circular flows. The budget constraints for these demands are set by the banking system that determines deposits, loans and advances to form a complete circular flow economy.

- A. These stock-flow consistent models have been developed on a detailed macroeconomic scale (FALSTAFF) that can be applied to different macroeconomic, distributional and environmental analysis, as well as in a simplified version (SIGMA), especially designed for issues of growth and inequality. A inter-industry model version of FALSTAFF that also includes more extended behavioural aspects (GEMMA), is still under construction. These three models within the model family described in *Jackson et al.* (2016) are calibrated to the data of a national economy.
- B. The other stock-flow consistent model belonging to this family and described in *Jackson et al.* (2016) is the multi-sector macroeconomic model ECOGRO. This model is calibrated to the EU as one economy. In ECOGRO the production process requires three complimentary inputs; capital, labour, and energy. Capital is generated through investment and worker households provide labour, while energy is supplied by the environment sector. Energy supply is an output of the environment sector and is described by an exogenously determined mix of non-renewable and renewable energy. The environment sector receives environmental emissions from the production process. The government earns tax revenue from firms, households and the financial sector which it uses to fund public sector investment and unemployment benefits.
- C. Another version of the stock-flow consistent modeling approach is the agent-based model described in *Rengs et al.* (2015). There the macroeconomic institutional sector level is based on the bottom-up, agent-based methodology (Tsfatsion and Judd, 2006; Gilbert, 2007). The macroeconomic picture follows a stock-flow structure that is consistent with the balance sheet approach (Godley and Lavoie, 2012) and includes households, firms, banks, central bank and the government. All sectors are disaggregated, except central bank and government, in the sense that they are composed of a multitude of agents and their interactive dynamic relations. The model is close in spirit to recent models by Cincotti et al. (2010); Delli Gatti et al. (2010); Riccetti et al. (2013) and Chen et al. (2014). The approach considers the economy as a complex evolving system that organizes itself endogenously. This is reflected by notions like non-equilibrium dynamics, (in)stability, systemic risk and vulnerability.

All three model versions (A, B, and C) are based on the stock-flow consistent Keynesian approach. FALSTAFF is well suited for all kind of macroeconomic issues (including income distribution) and aggregate environmental issues, whereas with ECOGRO specific issues of energy and climate change can be analysed. The agent-based version C can be used for tackling policy measures that aim at changing consumers' behaviour.

Households choose their seller in a boundedly rational way, based on their preferences, and differentiating between needs and wants. Consumption behaviour follows social processes, characterized by the dynamics of imitation and status-seeking behaviour (conspicuous consumption à la Veblen, 1899), including bandwagon effects (imitation of other consumers) and snob effects (consumption striving for rare goods – "exclusiveness").

A second group of agents are firms, which produce final goods using inputs of capital and labour. They employ a firm-specific production technology, with respect total factor productivity and emissions per output unit being heterogeneous among firms. Firms start with a number of differently scheduled credits (each with their own duration) emulating the reinvestment necessary to uphold the constant capital level to counter depreciation. The profits of the firm accumulate in its current account and funds are set aside for research and development (R&D) investments. Corporate taxes are applied to the remaining amount. The banking system and the government are modeled similarly to the stock-flow consistent models described above.

The Dynamic New Keynesian (DYNK) model

This model approach can be seen as a 'hybrid' between an econometric input-output model and a CGE model, as it explicitly describes an adjustment path towards an existing full employment long-run equilibrium. The main difference to the static CGE model that has been widely used in environmental analysis is the dynamics of a short-run Keynesian equilibrium (if the economy is not in full employment) and a long-run neoclassical equilibrium. The term 'New Keynesian' refers to this existence of a long-run full employment equilibrium, which will not be reached in the short run, due to institutional rigidities. These rigidities include liquidity constraints for consumers (deviation from the permanent income hypothesis), and wage bargaining (deviation from the competitive labour market). Depending on the magnitude of the distance to the long-run equilibrium, the reaction of macroeconomic aggregates to policy shocks can differ substantially. The model describes the interlinkages between 59 industries as well as the consumption of five household income groups by 47 consumption categories for the EU27 treating them as one economy. The model is closed by endogenizing parts of public expenditure in order to meet the mid-term stability program for public finances in the EU27.

The DYNK model describes households as dynamic optimizers according to the permanent income hypothesis, but subject to liquidity constraints, so that savings need to be built up for financing consumption and consumption depends partly on disposable income as in a Keynesian consumption function. This modelling philosophy follows the lines of the 'buffer stock model' of consumption (Carroll, 1997), and includes the consumption of durables and nondurables (Luengo-Prado, 2006). Disposable household income, including profit income, is only one source of consumption. The marginal propensity of consumption out of disposable income is, in general, higher

- for low income than for high income households. There is even no statistically significant reaction of consumption to temporary changes in disposable income for the highest income quintile
- for periods of high liquidity constraints and debt deleveraging of households than for periods where the debt burden of households can be kept constant or even grow.

The banking sector and firms are not included explicitly in the DYNK model, but only the flows between the household and the government sector are shown in detail. The following taxes are charged on household income: social security contributions, which can be further decomposed into an employee and an employer's tax rate and income taxes. The wage rate is the wage per hour and wage bargaining between firms and unions takes place over the employee's gross wage.

The production side in the DYNK model is analysed within the cost and factor demand function framework, i.e. the dual model, in a Translog specification that comprises different components of technological change. Autonomous technical change can be found for all input factors (i.e. the factor biases) and also as the driver of TFP (total factor productivity). The model is set up with inputs of capital, labour, energy, imported and domestic non-energy materials, and their corresponding input prices. This production structure is consistently linked to the input-output core of the model.

The labour market in the DYNK model is represented by wage curves for each industry. These functions describe the responsiveness of hourly wages to labour productivity (industry, aggregate), consumer prices, hours worked per employee, and the rate of unemployment. Labour supply is given by age and gender specific participation rates of different age groups within the population at working age (16 to 65) and evolves over time according to demographic change (age group composition) and logistic trends of the participation rates. Therefore, labour supply does not react endogenously to policy shocks.

The public sector balances close the model and show the main interactions between households, firms and the general government. Taxes from households and firms are endogenized via tax rates. The expenditure side of government is made up of unemployment transfers and other transfers to households, public investment and public consumption. Additionally, the government pays interest with an exogenous interest rate on the stock of public debt. The change in this public debt is equal to negative government net lending. The model is closed by further introducing a public budget constraint, specified via the stability program for public finances of the EU27 that defines the future path of government net lending to GDP. Due to the introduction of this net lending to GDP constraint, public consumption is then derived as the endogenous variable that closes the model.

1.2 Key specifications in macro-economic modelling

Important general similarities as well as differences between the stock-flow consistent class of models and the DYNK model described above exist.

Stock-flow consistency

The family of stock-flow consistent models considers all flow and stock changes between all the institutional sectors, whereas the DYNK model does that only between private households and the government. Therefore the flow dynamics between the other sectors (firms, rest of the world) is taken into account in the DYNK model, as saving and investment, as well as exports and imports are determined endogenously, but no full stock-flow accounting is carried out. That means that no data for stocks of firms' wealth and external net wealth exist in the DYNK model and these variables therefore do not play any role. In that sense, the DYNK model is 'less stock-flow consistent' than the other models and cannot be used for certain types of simulations, where financing of firms plays a role.

Keynesian/Neoclassical equilibrium

The macro-economy in the stock-flow consistent models is purely demand driven, whereas in the DYNK model a difference between the short- and the long-run exists with respect to the equilibrium concept. In the long-run full employment is achieved in the DYNK model due to higher consumption expenditure after debt deleveraging of households has ceased and lower wage inflation in times of high unemployment. The latter depresses domestic demand, but increases external demand. The public sector also has a neutral impact on the economy, after the net lending/GDP ratio has stabilized. In the stock-flow consistent model the impact of demand shocks does not depend on the situation of the economy (depression or boom), but on other factors like monetary policy. The wage curve mechanism built in into the DYNK model leads to accelerating wage inflation when the economy reaches full employment (the trend of the smoothed historical unemployment rate) and therefore positive demand shocks lead to price reactions in this situation of the economy. As in Keynes' original notion of the long-run ('...we are all dead') this achievement of full employment takes more than 20 years in the DYNK model. The EU economy converges to a stable growth path only after 2030 and an unemployment rate of 6% is only reached after 2040.

As is shown below, the class of stock-flow consistent models produces both results of increasing unemployment and of stable unemployment over time in a scenario without policy. The basic relationship at work in these models is Okun's law and in some scenario and model specification the GDP growth rate without policy does not guarantee stable and low rates of unemployment.

Behaviour of agents and policies

Prices play an important role in all models applied. Carbon and energy prices have a direct (in production) as well as indirect (via consumer prices) demand impact for energy and energy-intensive products. The price of labour has an impact on labour demand as well in all models. The two important issues in this context are: (i) how large are price elasticities and what type of relationship between production factors is specified (complementary vs. substitutive), and (ii) is the factor demand impact only driven by substitution effects or additionally by directed technical change via innovation. The latter aspect is taken into account in the stock-flow consistent models by policies driving innovation, financed out of revenues of energy/carbon taxation. In the DYNK model the demand reactions in the policy scenarios are only brought about by neoclassical substitution effects.

In some of the stock-flow consistent approaches capital and energy are complementary with the consequence of declining investment with carbon taxation, but environmental dividends in the case of capital saving innovation. In the DYNK model, capital and energy are complementary in some of the 59 industries, but are substitutes in some important energy-intensive industries (e.g. electricity generation). That yields a positive investment stimulus in the case of carbon taxation.

One model of the stock-flow consistent model family applies an agent-based approach and therefore allows for a broader concept of behavioural reactions and policies than just the price-driven changes.

Technical change and the growth/unemployment and growth/environment nexus

The growth/unemployment nexus is in all model scenarios (with and without policies) driven by (i) Okun's law that is implicit in the model structure and (ii) labour demand impacts from changes in the price of labour. If the price of labour is changed, unemployment can decrease as well at lower rates of GDP growth than in the baseline scenario, both in the stock-flow consistent models as well as in the DYNK model.

The growth/environment nexus has as one prerequisite the consistent linking of physical flows (energy, resources, emissions) to monetary aggregates in consumption and production.

The stock-flow consistent models link environmental variables (greenhouse gas emissions) to output, but allow for emission free or low emission technologies (e.g. renewable) that can substitute for emission intensive production processes. One stock-flow consistent model fully specifies an environment sector with energy production, requiring renewable and non-renewable inputs and absorbing Greenhouse Gas (GHG) emissions, generated through the production process. In one scenario the repercussions of the environmental impact on the economy are taken into account via the introduction of a damage function.

The other stock-flow consistent model explicitly specifies the emission reduction technology employed by firms. Half of the initial firm population starts with slight emission reduction technology and the other half starts without emission reduction. The technology changes over time through "green or environmental innovation". Investment in R&D leading to innovation is assumed to have an immediate effect either on carbon intensity of the respective firm's output or on total factor productivity.

The DYNK model developed by *Kratena and Sommer* (2014) deals with environmental flows on a disaggregate level of consumption and production activities. That comprises consumption of energy commodities that are emission relevant as well as the use of energy in the production processes of the economy. The durable stock of households (vehicles, houses, appliances) embodies the efficiency of converting an energy flow into a service level linked by the efficiency parameter. Any increase in efficiency leads to a decrease in the service price and therefore to an increase in service demand ('rebound effect'), besides its energy saving impact. Physical input demand in the DYNK model comprises energy inputs in physical units (TJ) by user and energy category which are converted into GHG emissions by user, as well as material flows in physical units (1,000 t) by material flow category.

In general, in the stock-flow consistent models labour and energy demand (and thereby emissions) can be decoupled from GDP growth by demand reactions (substitution) and changes in innovation and redirection of technological change. The focus of these models is on the latter effect, given the aggregate nature of these models that does not allow for a variety of labour and energy demand reactions across users.

On the contrary, in the current version of the DYNK model, the focus is on the demand reactions across 59 industries (for labour) and 59 industries plus five household groups (for energy and materials) and both components of technological change (TFP and factor bias) are exogenous. *Vogel et al.* (2015) have extended this framework towards a model with directed and induced technical change, driven by stocks of knowledge in energy- and labour-saving fields. This stock of knowledge is in turn explained by prices of labour and energy, showing only slow adjustment rates of technological change. Therefore, this mechanism has not been integrated into the DYNK model yet, but better specifications, using R&D expenditure as a variable that can be influenced by policies, are searched for.

In one version of the stock-flow consistent model (ECOGRO) technological change is specified similarly to an exogenous factor bias as in the DYNK model, namely by augmentation factors for the inputs of capital and energy. Contrary to the simulation exercises carried out with the DYNK model, this model is used for policy simulations, where these factors are simply changed exogenously.

In another version of the stock-flow consistent model (*Rengs et al.*, 2015) firms can improve either through total general ("non-green/non-environmental") factor productivity (i.e. a technological progress scale parameter in the production function) or via green innovation (affecting the carbon emissions per output). These two options are exclusive, with the firm decision about which type of R&D to invest in depending on past performance (profits). Carbon taxation therefore has a direct impact on the profitability of green innovation. Another channel is influencing the funds available for firms' R&D expenditure.

Income distribution

The family of stock-flow consistent models treats income distribution at the level of labour and capital income and links that to the accounting structure of stocks and flows. At the level of households that means that two household types are differentiated, one receiving income from capital and the other one from labour. All interactions between the household and the government sector are taken into account, so that distribution policies can be modeled (*Jackson et al.*, 2016). Besides that, all policies have an impact on income distribution as well and therefore tradeoffs and synergies can be identified.

In the DYNK model the primary generation of income between sources of income (wages, operating surplus, profit income, income from abroad, etc.) and the five groups of household income is explicitly modeled. Therefore the distribution of income from the factors capital and labour across different household groups is more differentiated than in the stock-flow consistent models. The secondary distribution of income (taxes on income, taxes on profits, social security contributions, transfers) is dealt with at the level of five groups of household income as well and allows for a broad range of policy simulations.

Both model types therefore contain an implicit relationship between income distribution and the environment that can be used in order to assess synergies or tradeoffs between these two areas. This relationship works into both directions. On the one hand, the distributional impacts of environmental policy can be assessed and in the case of negative impacts due to tradeoffs, efficient additional measures can be designed. On the other hand, the environmental impact of changes in the income distribution can be analysed and potential tradeoffs or double dividends explored.

In general, the modeling approaches comprise several specifications that can be seen as crucial for a policy strategy incorporating the targets of high income per capita and rising incomes, high levels of social inclusiveness, and respecting planetary boundaries. The most important ones are a broad description of macroeconomic linkages with physical/environmental and social/distributional variables. Very different reaction channels concerning potential ways of decoupling of both the labour market and the environment from GDP growth are considered. Concerning this aspect, the explicit and detailed modelling of technical change as a main driver of decoupling and the driving forces behind that (including policies) remain as important future research tasks in this line of modelling.

What is not taken into account are different types of trade policies like limiting globalization by cross border adjustments and differentiated labour market policies, though the DYNK model could be used in order to simulate these kinds of policies.

1.3 Model simulation exercises

The model approaches identified above are used for different types of analysis comprising the impact of certain past trends in one area (e.g. income distribution) in another (e.g. environment), as well as a broad mix of policy instruments which are combined in policy strategies. For analysing the impact of past trends, standard simulations are defined.

One specific feature of the modelling work is the simultaneous treatment of physical and monetary aggregates, and the analysis of social (income distribution, employment, labour market variables), economic (GDP, gross output, prices, external balance, public budget) as well as environmental (GHG emissions, energy use, material consumption) impacts of all scenarios.

Baseline trends and interrelationships between the three areas

There are two main thoughts in the context of a policy strategy that is specifically ambitious with environmental boundaries and targets. One is about choosing the right counterfactual. If environmental boundaries are serious in the sense that overshooting them yields an unsustainable state of the economy, then the baseline needs to incorporate these unsustainability repercussions on the economy. The other issue is about potential negative economic impacts of ambitious environmental policy with extreme reductions of energy/resource use. This is the case of a potential low growth scenario (the opposite of 'green growth') and its social repercussions. This latter aspect is directly linked to the issue of income distribution. Is low growth accompanied by a widening of the income spread and – if policy wants to reduce the income spread – how does that affect the environmental outcomes. These are the main questions asked with respect to this issue.

The feedback from the environment to the economy can take place in different forms like: lower labour productivity due to health effects, higher depreciation of the capital stock due to damages (weather events), and higher prices of resources due to higher costs (lower total factor productivity) in resource extracting industries. That these feedbacks from environmental damages need to be built into the baseline scenario has been shown from a welfare-theoretical point of view by Rezai (2011). The internalization of environmental damage in the baseline scenario then has consequences for the welfare effects of the policy scenario, because non internalized environmental damages represent an externality that leads to a non optimal outcome in the baseline.

In the ECOGRO model the issue of environmental feedbacks and the consequences of a low growth scenario is tackled within two policy scenarios.

- The first experiment looks at a de-growth scenario based on the limits to growth-hypothesis (Meadows and Club of Rome, 1972; Jackson, 2009; Victor, 2012). This hypothesis suggests that policy driven reduction in output will result in lower energy use and subsequently lower emissions (*LowCon*).
- The second experiment (*DmgFunc*) introduces a damage function that endogenizes the depreciation of capital stock to the level of emissions (Tol, 2002; Stern, 2007; Hope, 2011; Nordhaus, 2011; Rezai et al., 2012).

Whereas the lower output in the *LowCons* case is due to the postulated reduction in consumption expenditure and thus demand, the *DmgFunc* experiment results in higher output. This is due to the fact that increasing the depreciation of capital raises the investment requirement for firms. Since investment is part of final demand and credit financing is available due to endogenous money, output rises and unemployment decreases. That, in turn, means that the costs of higher depreciation do not affect the economy negatively in this scenario design.

The results (Figure 2 to Figure 5) show that neither the link between output and distribution, nor the one with the environment is predetermined. In particular, while the connection between output and unemployment conforms to the standard formulation of Okun's law, the income level and the functional income distribution are not as clear-cut.

The lower output in the low consumption scenario (*LowCons*) case coincides with higher unemployment and lower incomes, but also lower energy consumption and reduced emission, as expected. This scenario is therefore the opposite to the characteristics of a case of 'green growth' and clearly reveals serious tradeoffs between income and environmental targets. On the other hand, it also leads to a lower inequality between capital and labour income as a result of lower profit margins for capitalists that decline more than the wages. In that sense, a 'distributional dividend' can be reaped in that case.

The higher output resulting from higher investment in the endogenous damage function (*DmgFunc*) experiment is accompanied by lower unemployment and higher energy use and even more greenhouse gas emissions. This indicates that the link between emissions and damages corresponds with a 'weak sustainability' paradigm. If the resource constraints were absolutely binding, the emissions taking into account the environmental feedback could not rise, but needed – given the model structure – lead to even higher costs of environmental damages. Already in this 'weak sustainability' case the scenario of environmental feedback reveals lower real disposable

income and lower worker income relative to capitalist income due to the price dynamics. The higher level of loans increases prices as firms push the cost of loan repayment on to the consumers for both energy (through demand) and for final goods (higher financing costs), which leads to the lower real disposable income of households and redistributes away from workers. This clearly shows negative income and income distribution consequences of taking into account the environmental consequences. Comparing the distributional impacts of policy scenarios with those of the damage function (DmgFunc) experiment instead of those of the baseline, therefore clearly yields more positive results.

Another analysis showing the relationship between the environment and inequality is undertaken by using the DYNK model for calculating the carbon footprint of different household income groups. For this kind of analysis, based on input-output linkages, the main question is about the magnitude of a potentially counterbalancing effect of directly and indirectly less emission intensive consumption structures of rich household groups that compensate for the dominating effect of much higher consumption levels of these households. *Sommer and Kratena* (2016) find a small structural effect that dampens the level effect of the rising income for the footprint (Figure 1):

- The lowest income quintile has a share of 6% in disposable income, 7% in consumption expenditure and 8% in the carbon footprint, whereas the highest income quintile has a share of 45% in disposable income, 42% in consumption expenditure and 37% in the carbon footprint of all households.
- The income elasticity of the carbon footprint is 1.32 (direct carbon emissions) and 0.89 (indirect carbon emissions) for an increase from the lowest income quintile to the second, for an increase from the fourth to the highest income quintile this income elasticity is 0.69 (direct carbon emissions) or 0.62 (indirect carbon emissions).

This is mainly driven by lower shares of food and agricultural products in the consumption structure of rich households, which are not fully compensated by the higher shares of other emission intensive products (gasoline/diesel, electricity, air transport) in their consumption basket. A further model simulation in *Sommer and Kratena* (2016), where 5% of average disposable income of households is redistributed (by changes in transfer/tax schemes) from the highest to the lowest income quintile would lead to

- an increase in the consumption expenditure of the lowest quintile by 3.6%, which in turn would increase GDP (constant prices) by 0.15%
- the overall carbon footprint of households would in this scenario increase by 0.12%.

A reduction of the income spread therefore has an expansionary effect on the economy and also increases the carbon footprint, although by less than a unitary elasticity would suggest.

The stock-flow consistent macroeconomic model SIGMA (*Jackson et al.*, 2016) is used to analyse the question, if a slowdown in the growth rate leads to an increase in inequality. This hypothesis is based on the fundamental relationship between the growth rate, the savings rate and the capital rate of return, used in Piketty (2014). The relationship states that for a given rate of return to capital the income share of capital is a function of the relation of the savings rate to the growth rate. A decrease in the growth rate therefore *ceteris paribus* increases the capital share. *Jackson et al.* (2016) yield the result that inequality rises or decreases with a slowdown in the growth

rate depending on the elasticity of substitution between capital and labour. For low values of this elasticity the income spread between capital and labour might even be reduced. For realistic values of more than unitary therefore the income spread will increase. The main question therefore is, if this elasticity of substitution is constant and can or shall be influenced itself by policy instruments. For the case that this is neither possible nor desirable, *Jackson et al.* (2016) show that the inequality in net incomes can be changed considerably by progressive income taxation.

In general these simulations which can be seen as additions to the baseline, reveal tradeoffs between targets:

- In general, between both environmental and income dynamics targets on the one hand and equity. For the environmental targets that means reducing the income spread does not allow reaping a dividend, but gradually worsens the situation of the environment
- In the case of a low growth scenario between social inclusion (labour market participation) and equity on the one hand and environmental targets on the other hand.

Adding environmental damages to the baseline slightly changes the evaluation of the results of policy scenarios, especially with respect to income distribution impacts. In the case of 'weak sustainability' damages as assumed here these improvements in results of policy are only small.

Components of a policy strategy

The main components of a policy strategy aiming at targets in all the three areas (income targets, social inclusiveness and respecting planetary boundaries) analysed in model simulations comprise:

Environmental tax reform

This component includes all revenue neutral tax shifts between labour taxation and taxation of energy and emissions. In this component all tax schemes that fully include emissions generated in production as well as consumption are considered. In the different models the following scenarios have been simulated:

In ECOGRO:

- TaxF and TaxH introduces carbon taxes on firms and households (Herber and Raga, 1995; Marron and Toder, 2014).

In the agent-based stock-flow consistent model (*Rengs et al.*, 2015):

- Tax on CO₂ emissions without employing any additional climate policies (Scenario 2).
- Labour tax reduction (Scenario 4): this is the much discussed idea of a shifting from labour taxes to carbon (CO₂) taxes. This would alter the incentives for innovation from stimulating improvements in labour to carbon productivity, with potentially beneficial effects for environment and labour market.

In the EU27 DYNK model:

- Classical 'Green Tax Reform' where GHG emissions are taxed on an increasing scale and social security contributions (employers' and employees') are reduced simultaneously so that (ex post) public revenue neutrality is guaranteed.

One of these simulations (Scenario 2 in *Rengs et al.*, 2015) just introduces carbon taxation without any compensation via the use of these revenues. It is well known from the literature that such a taxation scheme is suboptimal from a macroeconomic and welfare perspective. Therefore the a priori expectation for the results of this scenario is not very optimistic in terms of synergies and dividends.

Changing consumption behaviour

This component includes measures that use price instruments at the private consumer level in order to induce behavioural changes as well as policy-driven behavioural changes the level of public consumption. The following simulation exercises have been carried out with the different models:

In the agent-based stock-flow consistent model (*Rengs et al.*, 2015):

- Consumer product subsidy (Scenario 5): a subsidy to lower consumer prices for less carbon-intensive products, to stimulate their rapid diffusion.
- Green procurement (Scenario 6): the government buys relatively much less carbon-intensive (greener) products. This is operationalized by letting the government search randomly half of the population of firms producing relatively clean products, and sorting them according to carbon intensity. The lower the distance to the cleanest firm the more the government purchases (and it buys thus the most from the cleanest product).

In the EU27 DYNK model:

- 'Environmental Fiscal Devaluation' where GHG emissions embodied in private consumption are taxed at the same rate and on the same increasing scale as in the classical 'Green Tax Reform' above, and revenue neutrality is also achieved by the same rule for social security contributions.

The basic idea is to make consumers aware of their local and global responsibility, expressed in the footprint of their consumption activities and give incentives for restructuring consumption demand. The consumer product subsidy in *Rengs et al.* (2015) is financed out of the revenues of the tax on CO₂ emissions.

Boosting innovation and (re)directing technological change

This component includes measures that aim at redirecting technological change via influencing the magnitude and direction of firms R&D expenditure and innovation activities and measures where it is assumed that the productivity of input factor use or the structure (renewable/non renewable) changes exogenously. The simulation exercises using the different models comprise:

In ECOGRO:

- *HiRenew*: this scenario highlights the costs of shifting to a higher share of low-emissions high-cost renewable energy (Trainer, 1995; Dincer, 2000; Tahvonen and Salo, 2001; Varun et al., 2009).
- *InnoK and InnoE* discusses technological innovation and resource efficiency that aims to address issues of growth in an absolute decoupling scenario (Binswanger, 2001; Yang and Nordhaus, 2006; Herring and Roy, 2007).

In the agent-based stock-flow consistent model (*Rengs et al.*, 2015):

- Research & development (Scenario 3): if a firm follows a green innovation trajectory, its R&D costs are subsidized. This can take the form of subsidies for the installation of green filters, for example. The total amount of R&D subsidies provided by the government will be approximately equal to the revenue of the carbon tax. Individual firms receive subsidies in relation to their R&D costs, weighted by the marginal effectivity of the improvement. Thus, if two firms have equal R&D costs (i.e. who have the same production capital), the firm that will achieve a higher emission reduction by R&D will get a higher subsidy.

The agent-based stock-flow consistent model (*Rengs et al.*, 2015) is also used to simulate a scenario where all climate policy instruments are combined (Scenario 7). In this scenario the carbon tax revenues are divided in equal parts among the different climate policy instruments at the end of each year.

Specific policies only aiming at a reduction of the income spread are not considered as policy scenarios. An exercise of this type has already been described in the last section, showing a tradeoff between equity and environmental targets. The policy simulations reveal that in cases of ambitious environmental policy more severe tradeoffs between the efficient achievement of environmental targets and equity exist.

Identifying tradeoffs and dividends of the policy strategy: simulation results

The crucial issue of the modelling scenarios is the viability of 'green and socially inclusive growth', i.e. the achievement of environmental goals implying an absolute reduction of emissions or energy and resource use while GDP is still growing and the income spread is reduced or at least not widening. This is mainly a question about the magnitude and direction of technological change and the costs of the measures for different household groups.

Two different versions of this 'green and socially inclusive growth' phenomenon could be thought of. One is the general compatibility of positive GDP growth and a constant income spread with an environmental policy scenario where emissions and energy/resource use are reduced continuously. The other one is that this environmental policy is even accompanied by higher GDP growth and a reduction in the income spread compared to the baseline scenario and where the environmental targets are achieved. This second version of the 'green and socially inclusive growth' hypothesis can be seen as a 'triple dividend' scenario.

Tradeoffs

The following scenarios reveal tradeoffs between the targets, at least between one pair of the targets.

In the ECOGRO model this is the case for the scenario where firms are taxed (TaxF) and prices for both energy and final goods rise as the tax burden is passed on to consumers. As a consequence, real incomes fall in the TaxF experiment but less than in the TaxH experiment. Thus capitalists partially increase the demand for goods through higher profits subsequently worsening the functional income distribution while keeping the output demand almost unchanged. So these two taxation schemes reveal negative distributional effects while leaving the output constant and not

achieving the environmental targets. The tradeoff therefore consists in environmental targets and income dynamics.

The results of the agent-based stock-flow consistent model (*Rengs et al., 2015*) also show a very clear tradeoff between environmental targets and income dynamics (Figure 6 to Figure 8). That applies to several scenarios, but most clearly to the pure carbon tax scenario without use of the revenues for other policies. This is clearly suboptimal and achieves environmental targets only at the expense of incomes and income distribution. The carbon tax Scenario 2 (CT) has the highest unemployment rate starting with 18% and developing till 24% after 25 years. This notion indicates that a carbon tax without any particular dedication for its revenues creates a significant problem for the labour market that needs to get addressed. The tax makes the price of carbon-intensive products more expensive and aggregate demand is shocked by this policy, translating into lower production.

In stock-flow consistent model (*Rengs et al., 2015*), the government can implement a price incentive via carbon taxes. The revenues accumulate in a "carbon tax fund", which is used to fund a number of policy instruments to either reinforce or complement the effect of the primary climate policy (carbon taxes), such as: directly support (subsidies) of green innovation, reducing labour taxes (creating employment), stimulating diffusion of less carbon-intensive products through (product subsidies to consumers), or even combining these instruments. In general, these policies boost demand and output which in turn leads to non-compliance with the environmental targets, though the policies have been designed to achieve these targets. This is a surprising and important result that can as well be interpreted as an 'income rebound effect' of certain policy instruments. That applies actually to all policy scenarios. The policies work as a demand shock for the economy and boost GDP up in contrast to BAU.

In all scenarios that use the revenues of carbon taxation (except the one with R&D subsidies = Scenario 3) even the initial value of GDP is significantly higher than BAU, since expectations of all actors are adjusted correspondingly from the start. The highest real GDP development is reached within the scenario of a tax shift between carbon and labour, i.e. the flat labour tax reduction on the household side that translates into higher purchasing power. This is what one might expect, but it should be noticed that the difference with the other policy scenarios are not that huge.

Two surprising results are worth to be highlighted:

- The scenario that combines all instruments does not stand out that much. The reason is that (equally) distributing carbon tax revenues over all mentioned complementary instruments dilutes the impacts of each compared to their effect in policy scenarios where all revenues are spent on a single instrument.
- By far the worst scenario in terms of emissions is the labour tax reduction – scenario (= Scenario 4). This is due to the growth effect on GDP driven by higher purchasing power in this scenario that outperforms the market selection on less carbon-intensive products.

This aspect is connected to the lending behaviour of firms which does not allow for too risky lending, so that green firm selection does not out-compete the general growth effect. That a revenue neutral tax shift from labour to energy (or carbon) may result in even higher energy use or emissions, has already been discussed in the literature (Bayindir-Upmann and Raith, 2003).

Both scenarios simulated with the DYNK model reveal tradeoffs between environmental targets on the one hand and income dynamics as well as equity on the other hand, but of different magnitude and focus.

In the case of 'Green Tax Reform' the tax rates for GHG emissions have been determined in line with the EU Roadmap for a low-carbon economy, starting off with a tax rate of 25 €/t of CO₂ equivalent (in € of 2005) in 2015 and rising continuously to 250 €/t of CO₂ equivalent (in € of 2005). The ex post revenue neutrality via lower social security contributions is implemented as an additional constraint in the public sector block of the DYNK model.

'Green Tax Reform' has (Table 1):

- positive effects on the labour market until 2030
- consistent negative impact on GDP
- negative or neutral impacts on the income spread

The negative GDP effect is due to price increases that in turn have a negative impact on exports (in an unilateral European taxation scenario) as well as on household disposable income. It is however, important to note that the annual difference in GDP growth to the 'baseline' is rather small, with only 0.15% p.a. Since fossil energy is not only a factor of production, but also a consumption good (fuels for cars and heating), the consumer price level increases more than the producer price level. In the long-run, employees' gross wage rate increases more than in the 'baseline', offsetting a large part of the lower social security contributions. The price effects also lead to a regressive impact on household incomes that can be avoided by changes in the transfer system.

The 'Green Tax Reform' scenario leads to considerably higher emission reductions as those observed in the simulations with the two stock-flow consistent models, but fail to boost GDP or have a neutral impact on income. The labour market impact can still be positive due to lower labour taxation, so the scenario implicitly changes the relationship of Okun's law. Due to the high emission reduction and low GDP dampening impact, considerable absolute decoupling is observed (Figure 9).

The leakage in terms of GHG emissions amounts to more than 30% in 2050 due to increased imports in a unilateral European policy scenario. The second scenario simulated with the DYNK model therefore takes this problem of leakage as a starting point.

In this 'Environmental Fiscal Devaluation', the embodied emissions of consumers are taxed with the same tax rate as in 'Green Tax Reform'. This tax reform can be seen as a special case of fiscal devaluation, i.e. a change in the tax system that mimics the price effects of a devaluation of the currency by rising taxes on consumption (higher prices of domestic consumption) and lowering taxes on labour (lower prices of exports).

This scenario shows synergies between income dynamics and environmental targets and in that sense comes closer to the results of the simulations with the stock-flow consistent models. That also refers to the result that the emission reduction is much less than in the 'Green Tax Reform' scenario.

The synergy consists of (Table 3):

- increases of both output (GDP) and increases of employment in the short- as well as in the long-run

- reduction of emissions relative to the baseline as well as in absolute terms
- reduction of emissions and resource use on a global scale by more than within the EU27 (negative leakage effect).

The tradeoff exists between environmental targets or, better said, the efficient achievement of environmental targets via consumer responsibility and equity (Table 2). The high consumer price increases exert a considerable regressive effect on household income groups. This issue needed to be addressed by a change in the transfer system which has not been modeled here.

Synergies and triple dividends

The following scenarios suggest the achievement of all targets and therefore the potential for triple dividends.

In the ECOGRO model this comprises all scenarios that boost innovation and redirect technological change: the scenario with the higher renewables share (HiRenew), as well as the scenarios with higher speed of innovation in capital (InnoK) and energy efficiency (InnoE).

In these scenarios of technological change (Figure 2 to Figure 5):

- emissions decline
- output and unemployment are stable
- real incomes rise and the ratio of capitalist to worker disposable income falls

The dynamics behind this result are the following: The InnoK simulation lowers the capital required for goods production, and thus indirectly the energy demand. The InnoE scenario shows similar outcomes although the transmission mechanism is a simple price adjustment process resulting from a decline in energy costs.

The scenarios therefore emphasize the role of technological change, both for energy efficiency as well as for emission free technologies (renewables). In these scenarios of (exogenous) technological change the environmental goals can be achieved with improvement in economic dynamics (GDP) and the labour market outcome, as well as redistributive effects towards low (labour) income.

Also in the agent-based stock-flow consistent model (*Rengs et al., 2015*) the triple dividend result can be achieved in the scenario putting all the emphasis on technological change. As has been mentioned above, this scenario yields better results in terms of the three areas of targets than the combined scenario of all policy measures. Innovation subsidies are widely regarded as an instrument of technology policy that is complementary to carbon taxes, in the sense that both are needed to foster a transition to a low-carbon economy. The reason is that carbon taxes alone will select the most cost-effective current technology (e.g., wind instead of solar PV, or a particular type of PV over another, even if it is uncertain whether this is the (environmental or economically) best technology in the long run. To keep a potentially attractive technological trajectory (e.g., solar PV) open, i.e. avoiding early lock-in, one can subsidize its R&D.

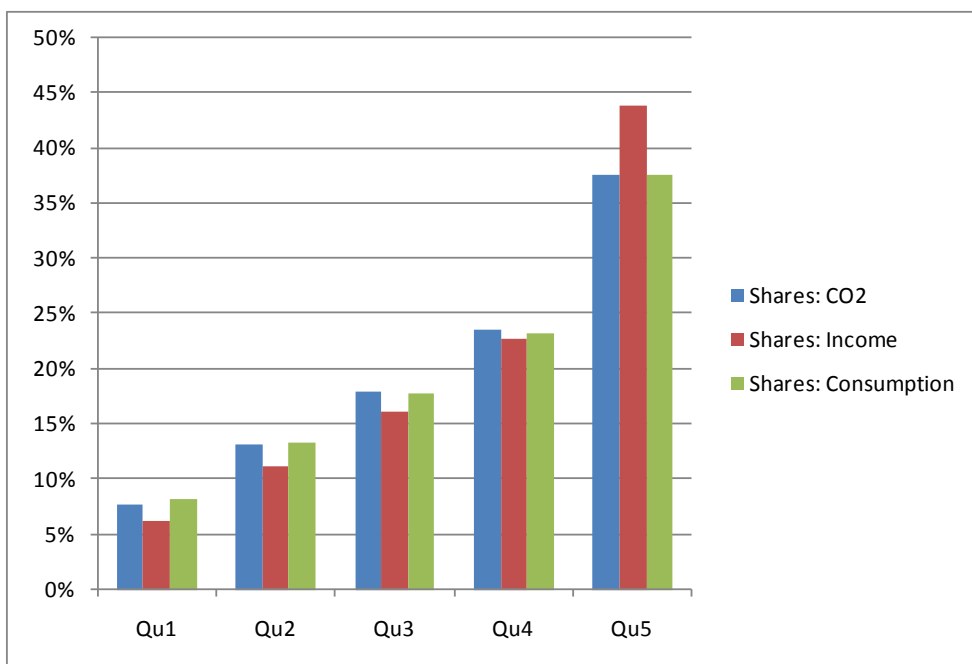
The R&D scenario therefore (Figure 6 to Figure 8):

- performs very well in terms of unemployment
- GDP stays stable compared to the baseline

- carbon emissions are reduced compared to the baseline

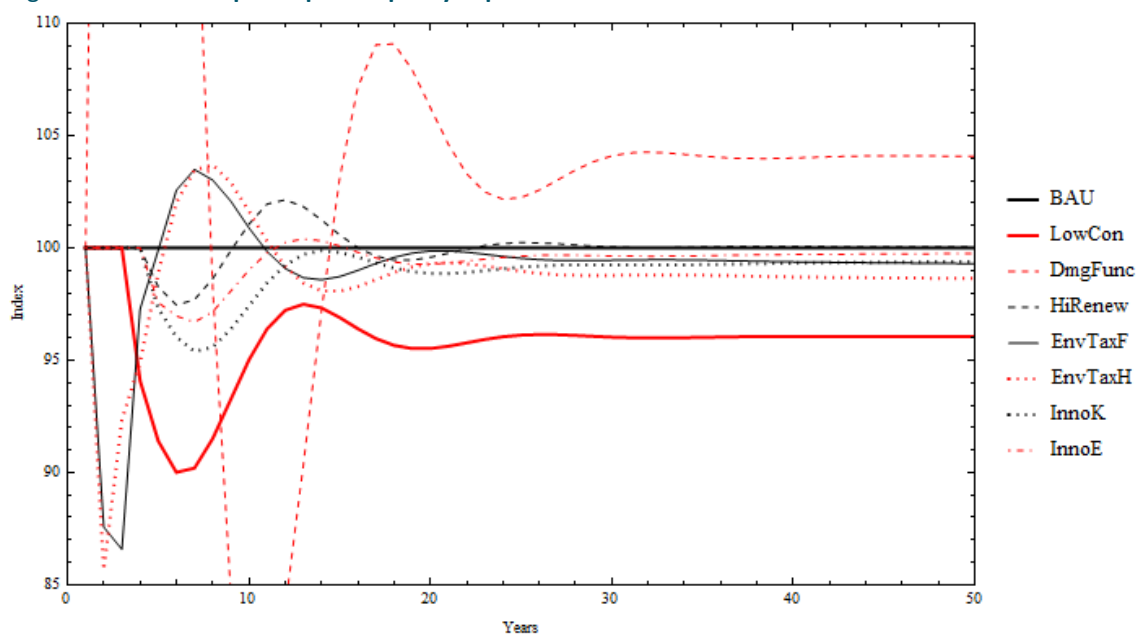
The emission reduction in this scenario is even higher than the one achieved by the simple introduction of a carbon tax (Figure 8).

Figure 1 **Income, consumption, and carbon footprint shares of household income groups in the EU27 DYNK model**



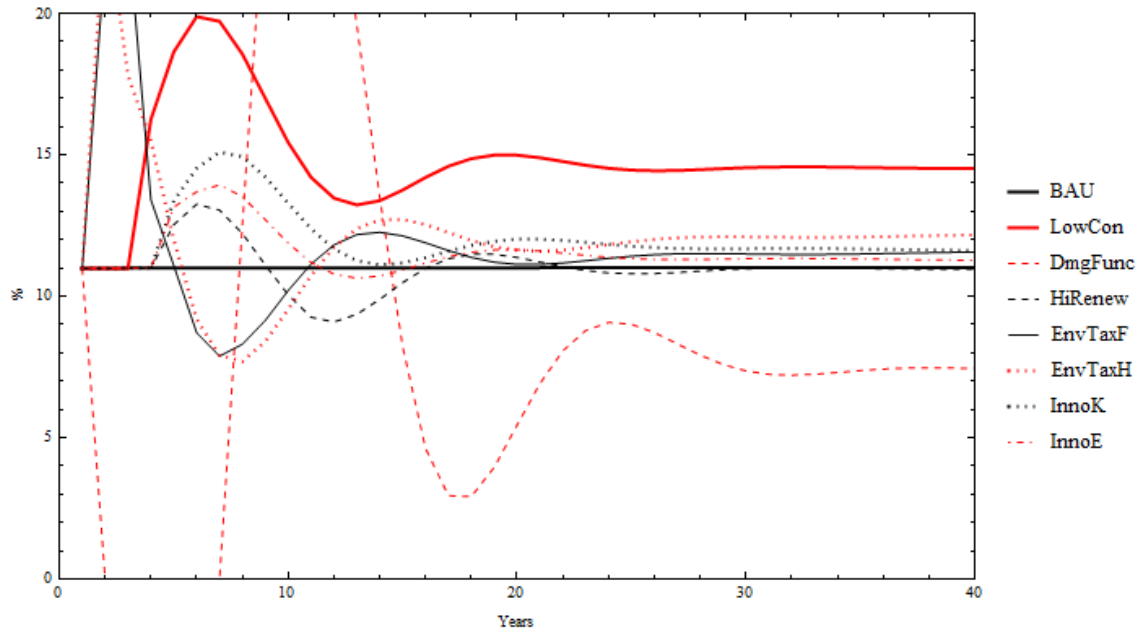
Source: *Kratena and Sommer* (2016).

Figure 2 **Real output impact of policy experiments in ECOGRO**



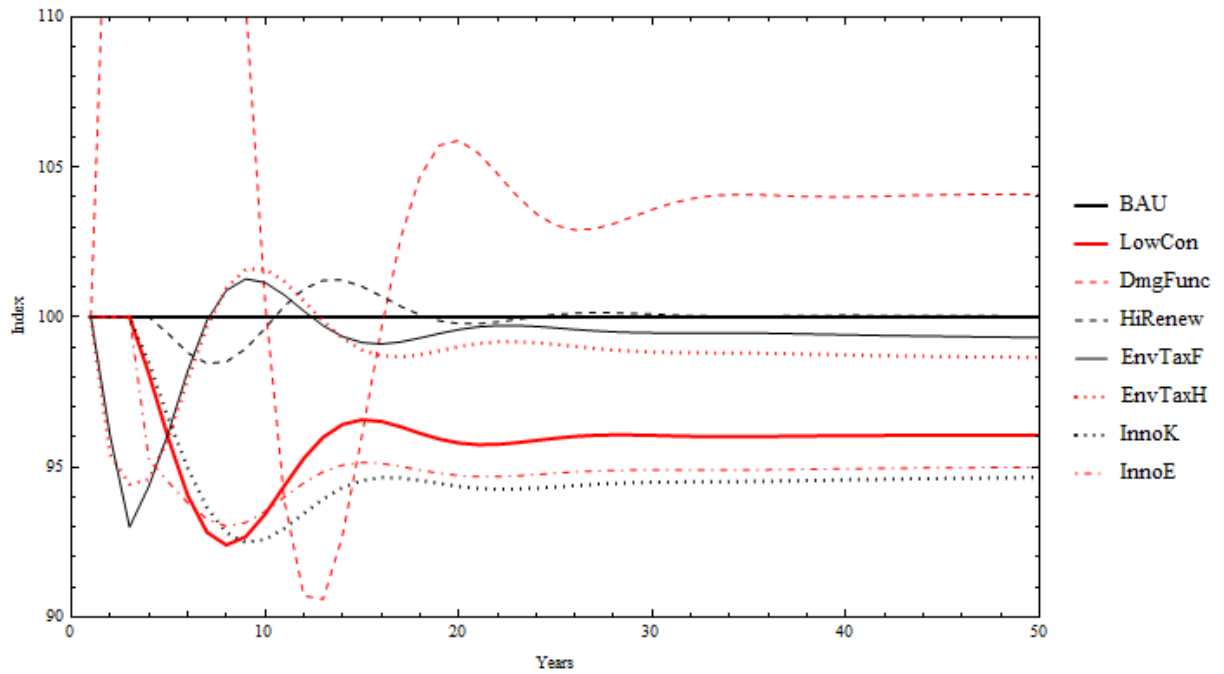
Source: *Jackson et al.* (2016).

Figure 3 Unemployment rate impact of policy experiments in ECOGRO



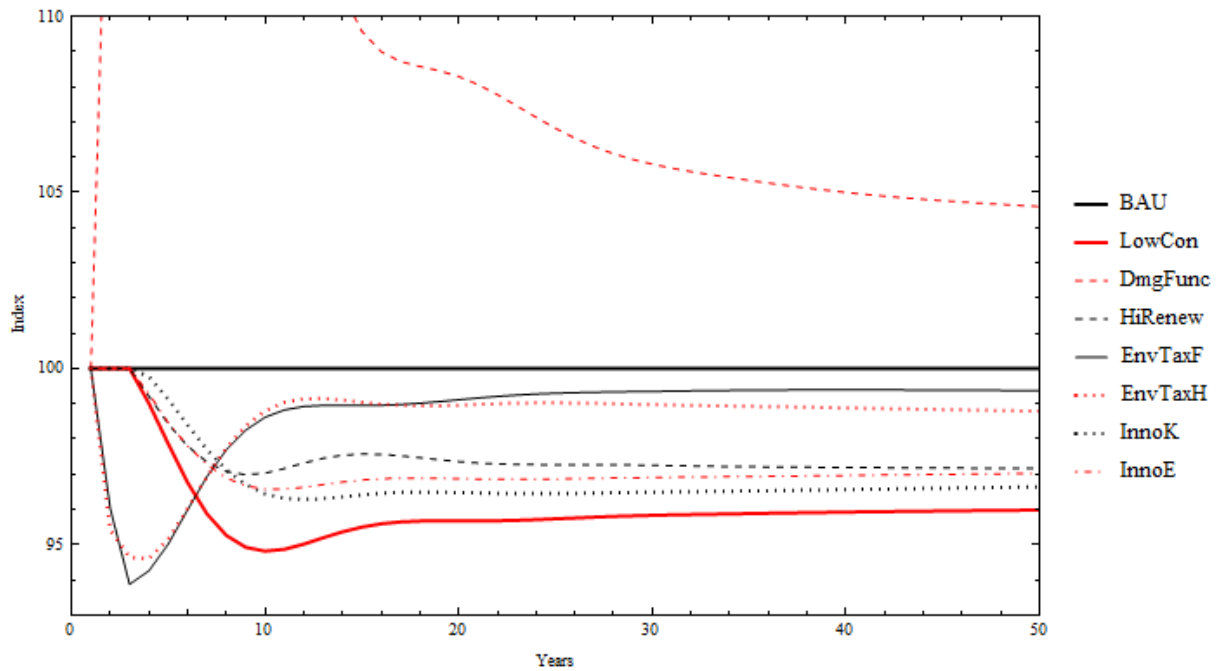
Source: Jackson et al. (2016).

Figure 4 Energy demand impact of policy experiments in ECOGRO



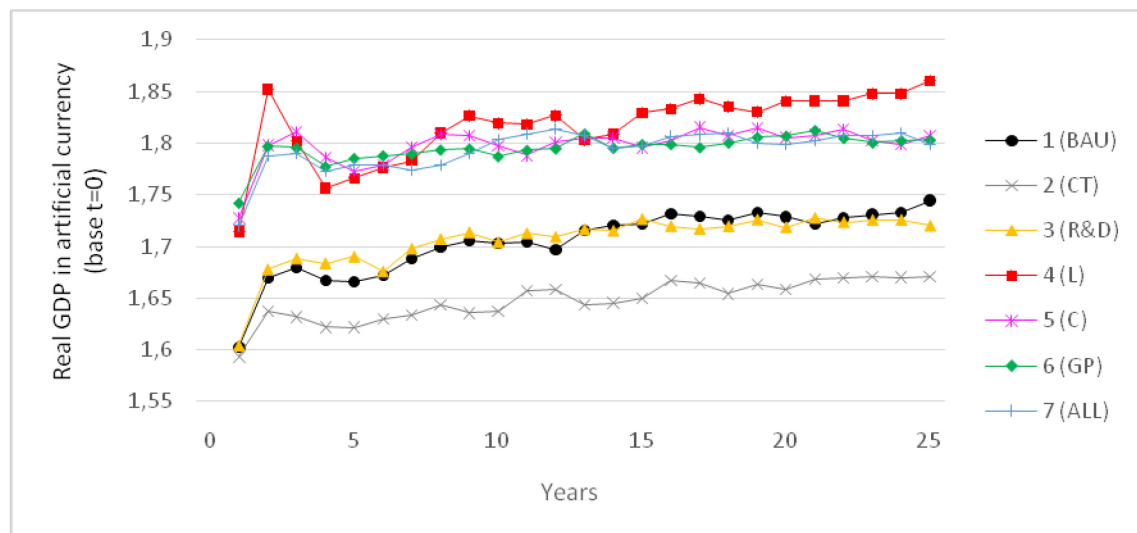
Source: Jackson et al. (2016).

Figure 5 GHG emission impact of policy experiments in ECOGRO



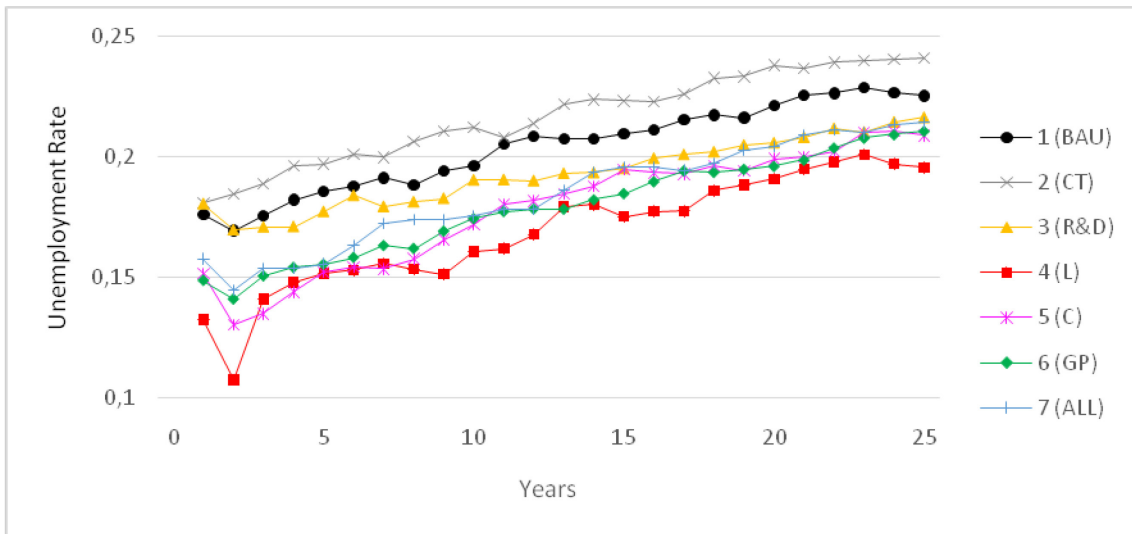
Source: Jackson et al. (2016).

Figure 6 Real GDP impact of policy scenarios



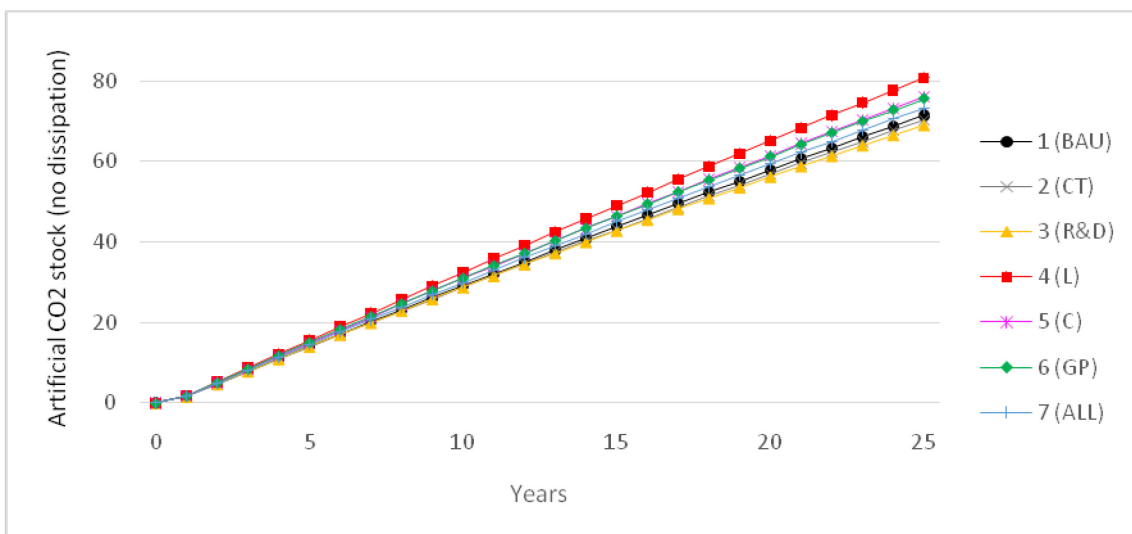
Source: Rengs et al. (2015).

Figure 7 Unemployment impact of policy scenarios



Source: *Rengs et al.* (2015).

Figure 8 Carbon stock impact of policy scenarios



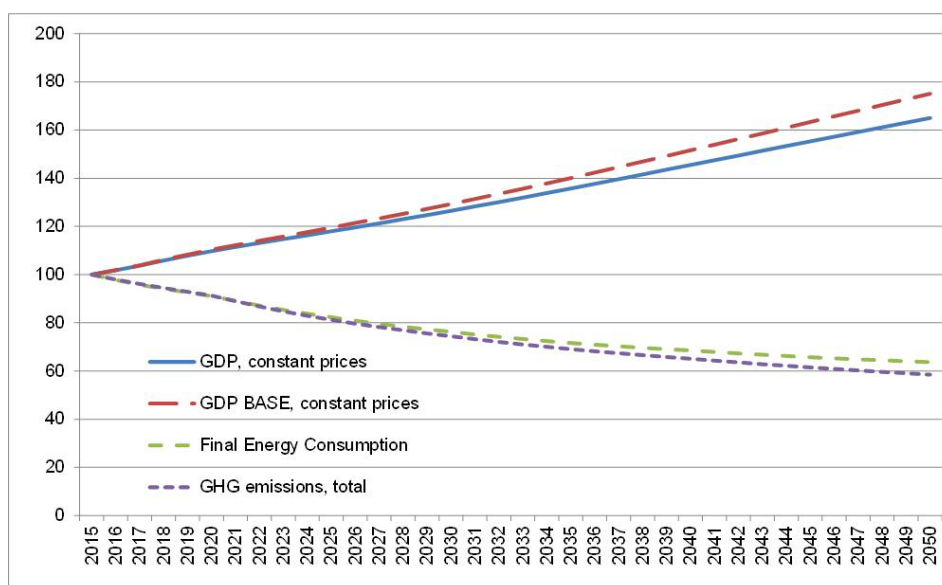
Source: *Rengs et al.* (2015).

Table 1 Macroeconomic effects of "Green Tax Reform"

	2015	2020	2030	2050
GDP, const. prices	-0.03	-0.54	-2.20	-5.79
Private Consumption, const. prices	-0.33	-1.55	-4.92	-11.13
Capital formation, const. prices	0.00	-0.01	-0.04	-0.09
Exports, const. prices	-0.19	-1.12	-3.92	-9.64
Employment (persons)	0.31	0.25	-0.20	-0.84
Employment (hours)	0.31	0.26	-0.17	-0.80
Unemployment (persons)	-2.21	-2.01	2.09	16.93
Unemployment rate (% points)	-0.27	-0.22	0.18	0.80
GHG emissions, households	-5.35	-7.98	-11.78	-14.80
GHG emissions, production	-9.81	-17.41	-30.03	-43.04
GHG emissions, total	-8.56	-14.79	-25.04	-35.34
GHG emissions, Leakage	-0.07	0.30	2.31	11.14

Source: *Kratena and Sommer* (2014).

Figure 9 Impact of "Green Tax Reform" on GDP, emissions and energy use



Source: *Kratena and Sommer* (2014).

Table 2 Effects of "Environmental Fiscal Devaluation" on households

	2015	2020	2030	2050
Durable consumption, const. prices	0.22	0.65	1.18	3.68
Nondurable consumption, const. prices	-0.04	-1.00	-3.09	-5.34
Energy, const. prices	-2.90	-5.91	-8.47	-6.94
Real disposable income, const. Prices	2015	2020	2030	2030
Total	0.16	0.16	0.36	2.83
1st quintile	-0.26	-1.48	-3.82	-7.38
2nd quintile	-0.09	-0.88	-2.49	-4.51
3rd quintile	0.05	-0.33	-1.06	-1.04
4th quintile	0.19	0.25	0.48	2.80
5th quintile	0.31	0.76	1.99	6.93

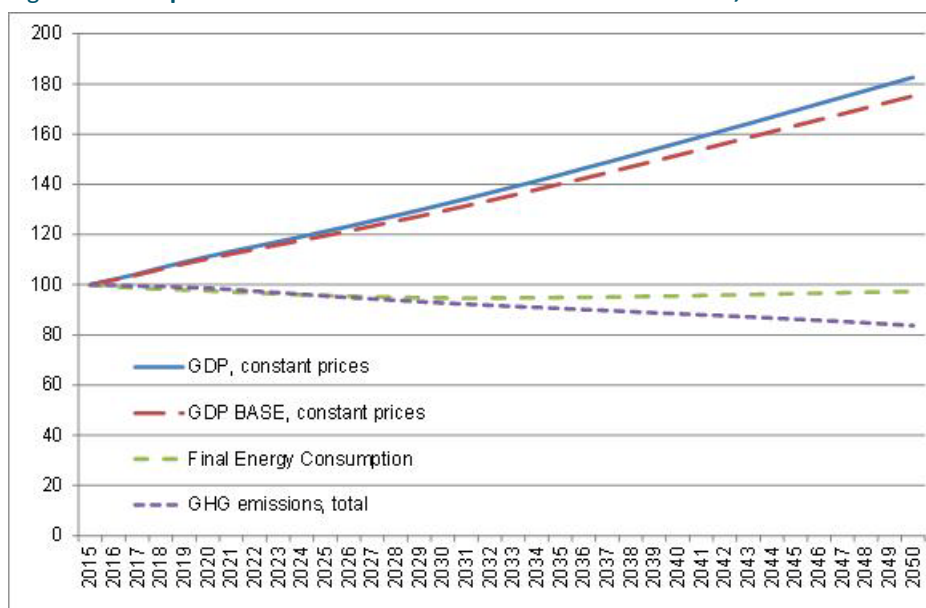
Source: *Kratena and Sommer* (2014).

Table 3 Macroeconomic effects of "Environmental Fiscal Devaluation"

	2015	2020	2030	2050
GDP, const. prices	0.34	1.11	2.39	4.62
Private Consumption, const. prices	0.02	-0.58	-1.94	-3.36
Capital formation, const. prices	0.00	0.00	0.00	-0.01
Exports, const. prices	0.32	0.92	1.28	-1.10
Employment (persons)	0.30	0.74	1.32	2.03
Employment (hours)	0.29	0.72	1.26	1.78
Unemployment (persons)	-2.18	-6.09	-13.93	-40.84
Unemployment rate (% points)	-0.27	-0.66	-1.21	-1.93
GHG emissions, households	-3.61	-7.19	-10.45	-10.16
GHG emissions, production	-0.42	-1.52	-3.82	-10.02
GHG emissions, total	-1.32	-3.10	-5.64	-10.05
GHG emissions, Leakage	-0.42	-1.12	-2.54	-4.78

Source: *Kratena and Sommer* (2014).

Figure 10 Impact of "Environmental Fiscal Devaluation" on GDP, emissions and energy use



Source: *Kratena and Sommer* (2014).

1.4 Conclusions

Macroeconomic modelling of policies aiming at the simultaneous fulfillment of environmental, social and economic objectives has the integration of several features into the modelling approach as a prerequisite. These features include an explicit treatment of the link between monetary aggregates and physical flows, an explicit representation of technical change and its relevance for the environment as well as a detailed treatment of the behaviour of agents (households and firms). Simulations have been carried out applying a family of stock-flow consistent models and a Dynamic New Keynesian model. Key specifications for assessing the impacts of a consistent policy strategy are: (i) stock-flow consistency, (ii) the notion of equilibrium (Keynesian vs. Neoclassical), (iii) treatment of behaviour, (iv) technical change as a driver of decoupling, and (v) integrating income distribution.

The policy strategy comprises the following components: (i) environmental tax reform, (ii) changing consumption behaviour, and (iii) boosting innovation and redirecting technical change. Besides that simulations have also been undertaken to analyse the consequences of a low growth scenario for income distribution and the nexus between income distribution and the environment.

The most important tradeoff that can be identified from the simulation results is the one between environmental targets and equity:

- Reducing the income spread *ceteris paribus* does not allow for reaping an environmental dividend, but – on the contrary – worsens the results for the environment.
- Taxation schemes that focus on consumer responsibility have *ceteris paribus* considerable regressive effects on households.

Simple policy instruments (e.g., environmental taxes without revenue recycling) also will show a tradeoff between environmental targets and income dynamics. Another aspect of this tradeoff is

that some instruments might boost output in a way that the initially intended environmental targets are not achieved (income rebound effect).

Triple dividends can most probably be achieved by:

- a combination of instruments with boosting and/or redirecting technical change
- a combination of instruments including taxing consumers' environmental responsibility and compensating low income households

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KEY INFO

- Area 1 addresses major economic and political challenges for European welfare systems and examines adjustments required in order to achieve a welfare state regime that is compatible with a new smart, sustainable and inclusive growth path for Europe.
- In particular, the following challenges are addressed: globalisation, the increased differentiation of social risks, the emergence of new 'life course models', growing periods of economic dependency, inequality of opportunities, and increased migration.
- After discussing tradeoffs, synergies and reform implementation challenges, Area 1 introduces a social investment perspective as a suitable and feasible option for European welfare state reform.
- This approach targets employment and activation, focuses on human capital formation and aims to improve ex ante abilities, in order to increase adaptability to a rapidly changing economic and institutional environment.

2. CHAPTER AREA 1: CHALLENGES FOR THE EUROPEAN WELFARE STATES

Hans Pitlik (WIFO)

2.1 Introduction

Representing a central pillar of a European Social Model, contemporary welfare states provide encompassing insurance against various income risks, produce health and education services, and redistribute income and wealth via taxes and transfers. Long before the recent economic and financial crisis social spending has become by far the major expenditure item in Member States' budgets. European economies have extensive social security systems covering old age, disability, sickness, unemployment and other contingencies, plus comprehensive education systems, mostly funded by tax payers. The traditional Western European welfare states were developed and consolidated in the post-war decades. They provide more or less universal social protection for a broad population against events such as unemployment and illness ("old" social risks), as well as ageing. In a more comprehensive view, welfare states endow citizens with a set of social rights complementary to civil and political rights and to attain the level of economic means and security necessary to participate fully in society. According to National Accounts statistics, general government outlays on social protection, health and education sum up to an average of 32.5% of GDP in EU28 (2012), reaching a maximum of 41.7% of GDP in Denmark. The share of welfare spending on overall government spending is above 50% in all Member States (except Cyprus, at 48.9%); and the (unweighted) budget share across all EU28 countries in 2012 sums up to 62.7%.²

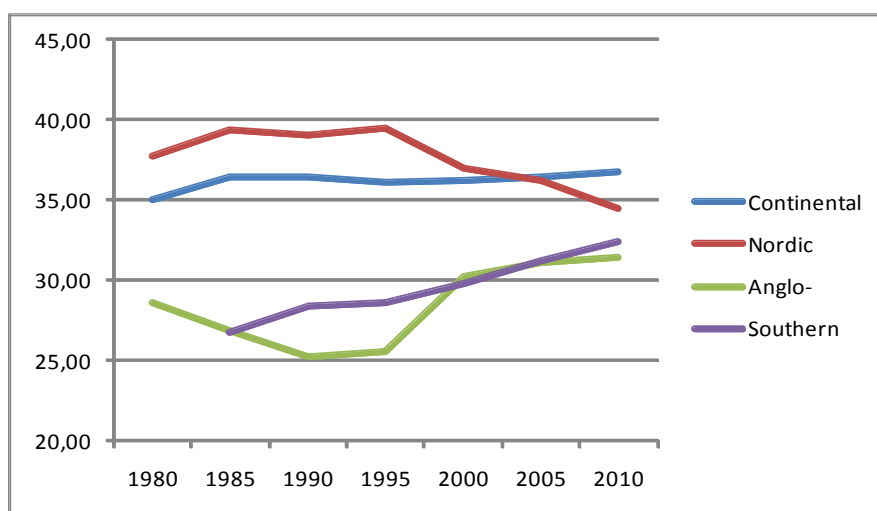
Predominantly perceived as a success story, the contemporary European welfare systems have grown and matured, and states nowadays have to deal with considerable and strongly inter-linked challenges. Governments face the increasing pressures of economic globalisation, an ageing population, immigration, and a general transformation towards a post-industrial society, associated

² Functional spending definition follows the Classification of Functions of Government (COFOG).

with substantial changes in individual life-styles and habits, while simultaneously being confronted with fierce budgetary constraints. Weak economic growth rates affected social security systems in Europe already before the financial and economic crisis. In industrialised countries, increasing public deficits, government debt levels and unemployment rates, as well as cost-related pressures of ageing societies, are going hand in hand with a change in the policy discourse, characterised by an austerity trend in macroeconomic policy and fears from looming tax competition (Hemerijck et al., 2013). Lower trend growth prospects, which may be either a consequence of the financial and economic crises, or compelled due to inevitable policy responses to climate change, as discussed in Area 2 of the project, will probably enhance adjustment strains.

As compared to other regions of the world, Europe still stands out in that household income inequality after taxes and transfers is still lower than elsewhere, and it has not increased much during the last three decades, as OECD data show. Although pre-tax/transfer inequality has increased substantially over the past decades, the Gini coefficient for major European countries remains below 0.31 during the late 2000s, and distribution of disposable income in Europe has only become a little more unequal over time, which can certainly attributed to by and large well-functioning welfare systems.

Figure 11 Total welfare state generosity index, by welfare regime group (period 1980-2010)



Source: *Leoni* (2015), based on data from CWED (Scruggs et al., 2014). Higher values imply higher overall generosity. Unweighted country averages across welfare regimes. Nordic countries: Denmark, Sweden and Finland; Continental: Germany, France, Austria, Belgium; Southern: Greece, Italy, Spain; Anglo-Saxon: Ireland, UK.

Nevertheless, welfare states have already adapted to a certain degree. A descriptive analysis based on data collected in the Comparative Welfare Entitlement Dataset (CWED; Scruggs et al., 2014) shows that aggregate generosity of welfare provisions in the domains of unemployment, sickness and old age, remained fairly stable over past decades. Behind this stable average, we observe a decline in the generosity in all three archetypical welfare state components in the Nordic countries (Figure 11), particularly pronounced in sickness and unemployment insurance. In these countries coverage rates were also lower in 2010 than in the mid-1980s. At the same time, Southern European countries went through a catching-up process, with substantial increases in coverage and generosity

along several dimensions. Interestingly, in Anglo-Saxon countries generosity in welfare provision did slightly increase since the mid-1980s. In addition, reform activity led to qualitative, transformational changes in numerous European countries that are not fully captured by quantitative generosity indexes. Examples for such changes include the well-known Hartz reforms in Germany, the re-orientation of the Dutch welfare state and efforts in many countries to introduce elements of privatization in old age security and boost occupational pension plans.

Allowing for various configurations of social spending and labour market regulations, evidence for the development of a uniform "European Welfare State" regime is yet rather weak (Esping-Andersen, 1999; Ebbinghaus, 2012). In an occasionally smooth, but often disruptive transition process the Central and Eastern European (CEEC) Member states have developed welfare systems which came closer to either more liberal (Anglo-Saxon) or coordinated (Continental) varieties of the traditional models since the 1990s. Hence, CEECs have established still distinct types of capitalism which show a certain degree of heterogeneity similar to institutional patterns of the 'old' welfare states (*Schweickert et al.*, 2013).

Against this background, Area 1 addresses major economic and political challenges for welfare state reform. Research focuses in particular on required adjustment towards a welfare state regime which is compatible with a new growth path for Europe that is at the same time "smart" (i.e., based on knowledge and education), "sustainable" (i.e., resource efficient, green and competitive), and "inclusive", aimed at high employment and economic, social and regional cohesion (European Commission, 2010). As mounting sovereign debt pressures and scarcity of fiscal resources in most affluent welfare states sometimes allude to retrenchment needs, the main focus is on a restructuring of contemporary systems. Ambitious policymakers have to consider numerous tradeoffs between important societal goals when designing politically feasible welfare state reforms. Specific tradeoffs will be shaped by path-dependency, i.e., they differ between national regimes depending on a country's economic and political history, development status and its institutional framework. Moreover, the most favourable ('best') solutions for these tradeoffs supposedly vary across a rather diverse group of nations, and strategies are essentially shaped by heterogeneous policy preferences, both within and between countries.

Country-specific welfare states designs imply wide differences in the extent to which reforms may be undertaken. Moreover, the need to address certain specific reform issues may differ substantially across countries and welfare state regimes. The aim of the research conducted in Area 1 is hence to identify more universal challenges, mechanisms and recommendations that apply to most (or 'all') Member states, but noticing that the heterogeneity of European welfare systems always has to be taken into account when it comes to formulating more distinct policy advice. In that respect, the notion of "competition as a discovery procedure" (Hayek, 1968) for ideas and superior policy concepts also appears to be of vital importance for the future design of different welfare states in heterogeneous economic, social, and institutional settings.

2.2 Area 1 results in a nutshell

The common starting point of Area 1 research is that a rapidly changing social, economic and technological environment, in combination with well-known long-run demographic developments

have generated enormous challenges for European welfare systems. Not only has inequality of market incomes been increasing remarkably in some developed countries over the recent 20 years; relatively high shares of the population in Europe face risks of poverty and exclusion, meaning that (i) they have an income below the risk-of-poverty threshold of 60% of median income; or (ii) they are severely materially deprived, or (iii) they live in households where adults work less than 20% of their potential. According to this definition, prior to governmental transfers still 24.4% of the EU27 population are at risk of poverty and social exclusion in 2013, as compared to a share of 25.7% (EU27) in 2005. After social transfers, the ratios are 16.4% (2005) and 16.6% (2013). The share of people facing persistent risk of poverty increased from 8.6% (2008) to 10.2% (2012) of EU27 population. Women and particularly children are more exposed to risks of poverty or social exclusion than men. Moreover, in the aftermath of the crisis, unemployment rates swell dramatically in some Member States, and especially youth unemployment mounts at socially, economically and politically intolerable levels.

Addressing challenges of globalisation

Economic globalisation has transformed the rules of the game for domestic labour and product markets and exerted strong influence on the constraints for social policy. Together with new modes of production, trade integration and the liberalisation of capital flows reduced the cost of international transactions and amplified competitive pressures from within the European Union and – even more so – from non-European low-wage countries. In the long run, trade liberalisation may lead to higher overall global welfare by allowing firms and workers to be allocated to more productive uses. In a shorter perspective, however, both firms and workers need to be reallocated from sectors with comparative disadvantage to those with comparative advantage to benefit from increased efficiency.

Relocation and outsourcing however affect the economic position of European workers, with an asymmetrical spin benefitting highly qualified workers to the detriment of low-skilled segments of the labour force. On the one hand, economic integration reduces employment prospects for particular groups, generating additional demands for redistribution and insurance. On the other hand, competitive forces put the generosity of welfare regimes in Europe under retrenchment pressures, and doubts are routinely expressed about the compatibility of welfare provisions with a successful participation in the global economy. Likewise, regulations which drive up firms' production cost, such as environmental regulations or employment protection laws are under scrutiny to become less strict. Competition for Foreign Direct Investment (FDI) may undermine regulatory capacities of countries and lead to a race to the bottom on corporate income taxes, and social and environmental standards.³ However, the lack of clear evidence for a race-to-the-bottom may be explained by the fact that taxation and regulation are not the only aspects that determine

³ Globalisation may also serve as a corrective device to tame a Leviathan government that redistributes taxes towards vocal and influential interest groups and an ever-expanding bureaucracy (Brennan and Buchanan, 1980). This (rather extreme) perspective evaluates globalisation much more positive, as international competitive forces governments to contain inefficient redistribution and wasteful spending. Other political economy approaches take a more differentiated view that democratic governments face an increasing political demand for social protection against a higher exposure of the economy to external shocks and a de-compressed wage structure (e.g. Cameron, 1978; Rodrik, 1998; Iversen and Cusack, 2000).

the international location of firms; institutional factors, or cost and market access considerations may be even more important (e.g. *Görg et al.*, 2009).

Whereas standard economic theory predicts that the net economic effects of trade liberalisation are positive, the current debates are dominated by fears of job losses and rising inequality of income. There is nevertheless evidence that since the 1990s, trade with emerging economies has had a deep effect on labour market outcomes in developed economies. Data suggest that intensified trade, in particular with China, has a positive aggregate effect on employment, but leads to significant job losses in industries that face strong import competition. Negative effects on wages and employment in developed economies are, above all, observed for low-skilled workers who perform routine tasks. As a consequence, workers who lose their jobs have to engage in a lengthy job search before finding a job in an expanding sector – and they often suffer from substantial wage losses in their new jobs.

The mechanisms of globalisation are hence assumed to simultaneously increase the need to redistribute and provide social insurance for poorer segments of society, especially for unskilled workers, and to diminish the ability of Welfare States to redistribute income and wealth. Policy makers thus face a twin challenge of maximising the (economic) benefits of globalisation and making it more inclusive. The relevant literature has frequently treated this challenge in terms of a severe tradeoff between competitiveness and welfare state generosity.⁴

Retrenchment may yet not be an inevitable consequence of globalisation. Evidence from OECD countries for the years 1995 to 2007 supports the idea that welfare expenditure can even be positively associated with overall productivity. Given vertical linkages in production that typically increase with industrialisation and generate aggregate economies of scale, globalisation can complement welfare state provision in stimulating aggregate demand and result in a virtuous circle of higher social protection, efficiency and welfare. In a world of increasing returns and of monopolistic competition, actual production may tend to be too low and thus inefficient. Then, welfare expenditures may step in to close the gap, raising consumption and production, improving efficiency, and thereby even lowering taxes on mobile capital. Area 1 research also provides evidence that, among other factors, firms' perceptions of a country's economic and social environment are an important locational factor. In this regard, a welfare state that helps providing a stable social fabric simultaneously increases a country's attractiveness for investment. Well-organised welfare states are not only attractive for foreign investors but may also serve as a hub for firms in the home country.

Furthermore, *Kopasker et al.* (2013) argue that competitive selection within industries influences labour market performance. Globalisation typically increases market shares of more

⁴ Within Europe there are nevertheless big differences how labour markets are structured and regulated, and the crisis revealed a substantial heterogeneity of welfare systems and on policies regarding labour market flexibility. Anglo-Saxon countries have more flexible labour markets, and relatively low minimum wages. Hence, employment growth in minimum wage jobs is quite quick as the economy recovers, but wage growth is low, and welfare benefits are required to support low wage earners. In many continental European countries, labour market flexibility is lower, so employment growth is lower, but people who are employed have higher earnings and higher productivity. As such, welfare payments therefore go to people who are still unemployed. Thus, different welfare systems not only have implications for welfare payments, but also in terms of people whose jobs face competition from globalisation.

efficient firms, pushing the least efficient firms out of the market. Empirical and theoretical work shows that reallocations within industries affect flows in and out of the labour market and the degree of wage inequality. Active Labour Market Policies in the form of employment subsidies can limit the negative effects of shocks. Such policies, which have gained importance during the recent recession, are key elements of a "European Employment Strategy" to address structural unemployment and to increase labour participation.⁵ Obtained results cast doubts on the conventional view that globalisation and negative international shocks challenge a countries' ability to maintain welfare state programmes. On the contrary, the welfare state can play a role in sustaining employment and recovery from shocks, and such a policy is compatible with fiscal 'prudence' and balanced budgets.

Of course, the preferred strategy to make globalisation more inclusive is to prevent workers from becoming losers in the first place. This requires investment in the human capital base of a country's workforce, since adaptive and well-educated workers stand to gain the most from globalisation. Policies that generate better and more equitable educational outcomes are not only suitable instruments for spreading the gains from globalisation more widely in society but also for increasing the aggregate gains from globalisation.

However, even a well-functioning social protection system cannot prevent substantial short run losses for those who lose (probably well-paid) jobs in declining industries. Hence, today's losers of globalisation should be compensated in the short-run. In that respect, the main challenges for policy design are that compensation may reduce aggregate benefits of free trade by distorting incentives of workers to move to their most productive use, and that it may simply be impossible to identify the actual losers of trade liberalisation. In any case, compensation should subsidize employment, not unemployment. According to Area 1 research (*Lechthaler and Mileva, 2013; Asatryan et al., 2014*), targeting compensation schemes to displaced workers reduces overall cost and distortions of such schemes. Affected workers in declining industries who nonetheless keep their jobs will typically suffer "only" via lower earnings growth. In contrast, displaced workers usually suffer large (and protracted) income losses. Compensation schemes should give displaced workers strong incentives to seek re-employment, and simultaneously improve the employment chances of displaced workers through job search assistance and training programmes. Workers would be compensated for a fraction of the wage loss that they incur because of the job change. However, workers displaced by import competition should not receive more generous benefits than other unemployed workers. Sectoral, occupational and regional mobility is important to reap the benefits of free trade, and extended benefits would reduce the incentives for workers to find a new job. Instead, job search assistance, efficient training programmes and other active labour market policies can help to improve the chances of re-employment and foster sectoral, occupational and regional mobility.

⁵ In subsequent research, *Molana and Montagna* (2015) show that in more general settings the specific nature of the optimal policy mix may vary. The underlying forces, however, are qualitatively unaltered and hinge on the effects of the policy on the toughening/softening of selection among firms.

Addressing the increasing differentiation of social risks

The long-term socio-economic transformations in Europe are not only shaped by an increasing international division of labour, but also to a substantial degree by rapid technological change, together with an accelerating speed of transition towards a service economy ("tertiarisation of employment"). In addition, a considerably growing entry of women into the labour force over recent decades, and substantial demographic changes due to ageing and migration have increased the size of social groups at risk as well as the likelihood of certain groups to be affected by income losses and social exclusion (Bonoli, 2005; Huber and Stephens, 2006). Large parts of the workforce are facing increasing difficulties to compete on labour markets due to skill set or personal characteristics; additional risks relate to reconciling paid employment with non-work life, particularly for households living with dependents (Nelson, 2012). Societies have become more fractionalised and biographies more individualized, thus diminishing the role of social class and of its intergenerational transmission as structuring factors of social risk.

While increasing heterogeneity and reduced predictability of risks constitute a serious problem for governments to provide effective social insurance, 'old risks' have certainly not disappeared. Social stratification continues to be a powerful predictor of risk prevalence, although different types of risk are stratified differently. The socio-economic background, gender, or ethnicity are still highly relevant for poverty duration, unemployment and health status (e.g. Tubeuf et al., 2012).

The differentiation of social risks into mutually independent stratifying ("vertical") and biographic ("horizontal") elements, that should also be seen as potentially complementary (Vandecasteele, 2011; Pintelon et al., 2011), requires a new orientation of welfare regimes. Arguably, if there is one single concept which applies most consistently to all reform processes in European welfare states over the last decades it is that of an "activation turn", i.e. a more active and employment-centred orientation of social policies, with a focus on ex ante-prevention instead of ex post-compensation of social risks (Cantillon and van Mechelen, 2013). Activation in combination with strong support for human capital formation in all life phases and with policies to address the interface between family and work life represents the core of the "social investment perspective" (Hemerijck, 2013). Social policy interventions should accordingly be clustered around the life course phases from childhood and youth (quality childcare and education), family formation and prime working age (training, measures to reconcile family and work) to old age (rehabilitation and care). In functional terms, the social investment perspective focuses on increasing workforce productivity and activity rates in order to cushion effects of demographic ageing; to support employability as well as the acquisition and retention of skills to empower individuals and prevent (permanent) unemployment; and on long-term strategies starting with early childhood to reduce poverty risks throughout the life course (Beblavý et al., 2014). Welfare state adjustment hence should be based on a multidimensional approach. Hemerijck (2013) accordingly differentiates between social policies targeting "flows" (activation and labour market transitions), "stocks" (human capital) and "buffers" (safety nets for social protection).

Addressing the challenge of reconciliation of family and work

A major trend in modern, post-industrialised societies is the erosion of the male breadwinner – female carer family model, and a shift towards a gender equality model with dual-earner families (Daly, 2005; *Plantenga*, 2014). The substantial increase of female labour force participation, fuelled by a big leap in women's educational attainment, is arguably the most important trend in labour markets of developed countries over the past decades (Goldin, 2006). Yet, in all EU member countries, female employment rates are lower than the male employment rates. Moreover, countries with a small gender employment gap are likely to have a higher total participation rate, whereas those with a lower employment rate are likely to record relative large gender gaps.

Increasing female labour force participation has created numerous new tensions and needs for a recalibration of traditional welfare states.⁶ One particular example analysed in Area 1 research (*Leoni and Eppel*, 2013) is the reconciliation of family and work. Since the increase in female employment has neither resulted in an equal gender division of unpaid work nor an equivalent externalisation of household activities to public or private service providers, it is primarily women who are exposed to the risk of experiencing some sort of work-family conflict (e.g. Janus, 2012), with rather unpleasant consequences. Paid work is generally beneficial for physical and mental health, and employed persons enjoy better health than the non-employed or intermittently employed. As the more disadvantaged women are less likely to experience the work pathways associated with the greatest health benefits at later stages in life, early life-course disadvantages tend to accumulate over time.

Leoni and Eppel (2013) follow a life-course perspective and investigate the realised work-family profiles of women up to the age of 50 in connection with life conditions in childhood and early adulthood and health status at mature age. In contrast to earlier studies that investigate the relationship between work pathways and health for single countries, the analysis covers a range of countries and is embedded in a comparative framework. Not surprisingly, there exists a large variation in the distribution of work-family profiles across welfare state regimes. It is shown that women with favourable initial conditions, depending on socio-economic status of parental home, childhood health conditions and cognitive skills, are more likely to reconcile care for children with continuous employment over the life-course. Evidence confirms also that for mothers the pursuit of continuous employment is associated with more favourable health outcomes than careers with marginal or intermittent employment. A positive link between mothers' employment up to age of 50 and subsequent health is strongest in the Nordic and in Eastern European countries, and much weaker in Continental Europe and insignificant for Southern Europe, where full-career mothers represent a minority. In regimes where employment of mothers is more common, health effects depend on the opportunities to reconcile family with paid work. From a policy perspective findings provide evidence that the combination of family and continuous employment is beneficial for

⁶ Such reform requirements also include the abolishment of an explicit or implicit gender bias in most European tax systems, thus frequently discouraging female labour market participation. However, Area 1 research does not deal with tax design in this project.

individual wellbeing and strengthen the case in favour of policies in support of work-family reconciliation.

Entitlements to job-protected leave for parents are yet not without any objections. On the one hand, parental leave policy subsidises leisure consumption which decreases the overall participation rate. On the other hand, temporary leave can facilitate return to the labour market and limit the loss of human capital after a period of non-participation. Empirical studies indicate that the labour market effects of leave might indeed be positive, but only if the leave period is not too long (Akgündüz and Plantenga, 2011). Child benefits and home care allowances favour a male breadwinner/female care-taker specialisation. To the extent that care responsibilities are a major obstacle to overcome this gender bias, child care services can be an important element to promote female employment and support an individualised adult worker model. In fact, empirical studies repeatedly find availability and affordability of childcare services to be positively associated with female participation and employment rates. In spite of this, family policies can only to a certain extent be re-designed in accordance with employment goals. Family support policies are multi-dimensional and may easily be dominated by other issues, e.g., maintaining or increasing the fertility rate, aspects of education and child wellbeing, and – still highly important in a heterogeneous group of countries like the EU28 – different family values.⁷ Against this background, more options for individual choice, increasing flexibility of working hours, possibly in combination with a (substantial) reduction of the daily or weekly working time, are always to be preferred (Esping-Andersen et al., 2002).

In spite of the strong convergence between men and women in labour market participation rates and even more so in educational levels, gender continues to represent a distinct dimension and will have to be explicitly addressed in all reform processes. Gender-differences are not confined to the incidence of social risks such as poverty and social exclusion, but they extend also to the causal processes that underlie the occurrence and distribution of these risks.

Addressing demographic and economic dependency challenges

One of the most pressing challenges that European welfare states are currently facing is a rapidly changing demographic structure. According to EUROPOP2013 projections, between 2020 and 2029 about 70 million people will reach the age of 60, while only 55 million will turn 20, which is the average age at which people enter the labour force (main scenario). Without substantial adjustments of institutions and economic behaviour this anticipated demographic shift will result in a pronounced reduction of workers compared to elderly persons, endangering the provision of pensions, health care and long-term-care of the elderly. Moreover, an ageing population may be less productive, imposing further risks on the sustainability of funding welfare state services, although effects of ageing on per-capita growth are not always so clear-cut and may be limited to developing countries (c.f., Gonzalez-Eiras and Niepelt, 2012; O'Donnell et al., 2014).⁸ Progress of life sciences

⁷ Korpi et al. (2013) argue that the impact of different family policies should be assessed on differently situated women and men, taking social-economic (class) differences into account.

⁸ A further strand of the literature investigates potential impacts of ageing on labour markets. While Shimer (2001) finds a strong relationship between the share of youths and unemployment rates in the US, with a larger share of younger people increasing

research in providing means to healthy ageing is considerable. Yet, the burden of chronic diseases on people of retirement age also appears to be substantial, and it will possibly increase due to population ageing and prevailing lifestyle risks, for both men and women. Activity limitations before reaching the retirement age almost certainly contribute to higher economic costs, and government interventions are needed to improve work participation of people with chronic diseases (Harbers and Achterberg, 2012).

Until 2060, the economic old-age dependency ratio (defined as the population aged 65+ as a percentage of the population aged 14 to 65) is projected to rise in EU28 from 27.8% (2013) to 50.1%. Numerous studies have addressed the question of how to adapt European pension and health systems to the (welcomed) rise of longevity, so that long-term fiscal sustainability under very unfavourable projections for the cost of ageing and the funding of services can be ensured. The basic recommendation, however, always boils down to adjust the statutory retirement age, and to make earlier retirement economically less attractive. As the European Commission in a recent report (2013: 7) emphasizes, "a dynamic view needs to be established on the balance of life spent working and spent in retirement, moving beyond the out-dated 'exit signal' of 65 years of age which dates back more than 100 years ... Increasing the retirement age preserves the sustainability of pension systems while allowing individuals for enhancing retirement incomes through longer working lives and the accrual of additional pension rights." Taking into account young age dependency, the demographic dependency ratios in Europe will increase by more than 25 percentage points and will reach levels well above 75%. The total inactive population over employment (20 to 64), according to these predictions will be 141.6%.

An intergenerational welfare state provides for the young (education) and the old (pensions), all of which is financed by taxes levied on the economically active middle-aged. Both branches of the welfare state are required if welfare gains are to be released without any generations suffering along the way (Andersen and Bhattacharya, 2013). When generations overlap and the young must borrow to make educational investments, a dynamically-efficient welfare state, by taxing the middle-aged and offering a compensatory old-age pension, can generate higher long-run human capital and welfare compared to *laissez faire*. However, as Area 1 work (*Hammer et al.*, 2013; Loichinger et al., 2014) illustrates, a too narrow focus on (formal) old age- and young-age-dependency does not capture adequately all the risks that are potentially associated with demographic changes, and as a consequence it also hides potential insights and solutions of a highly complex inter-generational contract. Meaningful economic dependency ratios take into account not only the demographic structure, but also differences in age-specific economic behaviour such as education schemes, labour market activity, income and consumption, international differences driven by both age-specific economic behaviour and in the age composition of the populations. Taking into account periods of inactivity as education, unemployment, retirement, etc., as well as age-specific consumption patterns from National Transfer Accounts, one can calculate life cycle surpluses (LCS) and deficits (LCD). LCD and LCS show the difference between consumption and labour income at a

aggregate unemployment rates, Foote (2007), does not find that changes in the age structure of the population have an impact on aggregate unemployment rates in an economy.

particular age, and hence constitute a measure for periods of transfer dependency. In addition, the method can be applied to estimate gender-specific differences.

Following this procedure one can find substantial differences across countries: Controlling for the age structure of the population, the LCD for young people lies between 20% of labour income in Austria and 29% in Italy; for elderly LCD amounts to values between 21% in Sweden and 30% in Hungary. Regarding the age where people on average consume less than they produce, in Sweden people generate an economic surplus from age 26 until age 63, observing LCS for no less than 38 years, while Slovenia, Italy, Finland, or the UK, observe only 32 years with a surplus.

The analysis also shows that cross-country gender differences are to a large extent caused by differences in the labour supply of females with children, which is in turn influenced by the prevailing family policies including monetary benefits as well as the provision of childcare. Especially the gender specific analysis of LCS/LCD needs to take into account unpaid work to obtain a complete picture of the re-distribution of resources across age. Unpaid work peaks in childbearing age for women, reflecting the time which is devoted to childcare. For both, men and women, there is another peak in old age as part of the reduction in time devoted to paid work is replaced by household production. The results of *Hammer et al.* (2013) clearly indicate that a reform of the welfare system needs to take into account not only public transfers but also private transfers, in particular those that relate to services produced within the household for own consumption.⁹ An increase in female labour force participation – as commonly argued as a means to reduce pressure on public budgets in ageing populations – needs to be accompanied by substituting private intra-household transfers.

Accordingly, sustainability of welfare state provisions in an ageing society not only requires adjustment of the statutory retirement age. Instead, the whole set of instruments impacting on labour supply patterns and age-profiles of economic activity should be used. Greater female labour-force participation can mitigate the economic consequences of an ageing population in countries where it is still below male participation. However, the extent to which the female labour force can be raised without negatively affecting fertility depends strongly on the design of the transfers, the education system and the distribution of childcare tasks between state, core family and extended family. Hence, a successful approach requires a right 'mix' of policies.

Addressing the challenge of inequality of opportunities

The ideas developed so far point to an overwhelming importance of the concept of inequality of opportunities. In general, ethically based notions of fairness and justice suggest that differences in external circumstances which are beyond an individual's control should not count as tolerable sources of inequality, whereas unequal outcomes are acceptable to a certain extent, provided they are rooted in personal effort and competitive markets (Roemer, 1998). Inequality of opportunity however plays a role beyond questions of justice and fairness, as removing it may simultaneously

⁹ A larger transfer of goods and services through non-market production activities from elderly persons to younger age groups can be only observed in Spain, Italy and Slovenia. In these countries a high share of older people live together with their children.

contribute to other economic objectives. While unequal incomes that are based on uneven effort are supposed to generate incentives to work, inequality of opportunity proves to be a serious obstacle for economic development (Aghion et al., 1999; Marrero and Rodriguez, 2013). Reduced social mobility most likely causes a misallocation of skills, with negative consequences for the country's growth performance. For overall wellbeing and sustainability issues inequality of opportunity is by far the most important challenge (Atkinson and Morelli, 2011). Hence, a new understanding of a welfare state is required, which does not focus on ex post-redistribution of unequal incomes and wealth but emphasises the role as an active promoter of equal employment opportunities and labour market participation.

According to cumulative advantage theory the relative advantage (or disadvantage) of an individual or social group over another accumulates over time. As a consequence, inequality with respect to key stratification factors such as cognitive development, wealth, or health, also increases over the life course (DiPrete and Eirich, 2006). Empirical research shows how initial status and events from early points in the life-course unfold enduring consequences for life chances (Schafer et al., 2011). A large body of literature confirms the long-term consequences of childhood adversities on later life trajectories, particularly with respect to wellbeing and health outcomes (Hayward and Gorman, 2004; Brandt et al., 2012). These findings lend support to the view that modern Welfare States should pay sufficient attention to addressing inequalities in opportunities.

Area 1 work clearly illustrates that inequality of opportunity is deeply rooted in many societies, and that one of the main causes is lack of intergenerational mobility.¹⁰ In a society with high intergenerational persistence, outcomes of children are defined by their parents' background; outcomes are less related on personal effort and investment, but instead are determined by the social background of one's family. However, intergenerational persistence varies substantially for different groups of people across Europe. Public policies can have an enormous impact and can foster or hinder an environment conducive to steady economic growth and wellbeing. The general process that causes persistence is rather complex. Yet, the two main 'social policy channels' to impact on intergenerational mobility are (*Altzinger et al.*, 2015)

- investment in education, which should create equal educational opportunities early on and for all children, and which supports those less well-off and enables them to make informed decisions about their educational careers;
- social security policies, that strengthen households' financial capacities to give economic opportunities to all children regardless the (socio-) economic background.

Well-designed policies would not only improve equality of opportunities, but – maybe even more important – would also contribute to mobility and economic growth, as different policy structures and arrangements across countries can prevent or support intergenerational persistence. From the perspective of developed maturing welfare states in Europe, fostering equality of opportunity becomes a matter of educational attainment and mobility. A high intergenerational persistence in educational attainment implies that children of each well-off parent generation have access to

¹⁰ A society is said to face intergenerational persistence when the outcomes of descendants are correlated with, or dependent upon, the outcomes of their parents.

higher education levels, while children from disadvantaged socio-economic backgrounds do not proceed above low education levels, irrespective of talent or effort. This results in a misallocation of human capital and affects the productivity of the labour force.

Crespo Cuaresma et al. (2013A) study the link between intergenerational education mobility and economic growth at the macroeconomic level using a new unique global dataset of education inequality by age groups, spanning the period from 1960 to 2010. Constructing Education Gini Coefficients (EGC) to measure inequality of education¹¹ it can be shown that inequality of educational attainment as well as the corresponding gender gap has decreased substantially over the past 50 years across Europe. Defining educational mobility as the ratio between the EGC of age group 25 to 54 and the EGC of the 55+ age group, one finds longer cycles in intergenerational education mobility. Most importantly, not only the average education level but also intergenerational mobility is positively related to growth. Countries that succeeded in reducing educational disparities in particular in their younger cohorts have grown more rapidly in the last five decades than countries which have been less successful in this endeavour, and therefore have a double positive return.

Addressing the migration challenges

Population forecasts suggest not only that most European countries will face a rapidly ageing society, but also an increasing diversity in their foreign born population. However, the effects of immigration appear to be rather complex (*Crespo Cuaresma et al.*, 2015A).

Selective immigration may be required to keep the European population from shrinking, and to prevent a decline of the working age population. Given current and expected demographic trends, the age structure of migrants is indeed a mechanism to increase the share of working age population in Europe. Using data from stocks of immigrants to 17 EU countries, OECD data indicate that in the 25 to 64 year age group, immigrants constitute a considerable share of the population (*Crespo Cuaresma et al.*, 2015B). Higher immigration rates may be an appropriate instrument to deal with the challenges of an ageing society, provided that current restrictive migration regimes were liberalised sufficiently to allow for more immigration and easier work permits.

The future of economic growth and the sustainability of welfare systems in EU28 will depend to a large extent on whether young migrants possess the required skills and on their integration in European labour markets. Quite a few studies have shown that highly skilled migrants have substantial positive effects on the competitiveness of an economy. To the extent that migration flows towards Europe alter the relative size of population by age group, their rejuvenation effect on Europe's population can be thought of as creating a migration demographic dividend, whose potentially beneficial effects will be realized depending on the skills of migrants. Yet, many studies (e.g. Hierländer et al., 2010; OECD, 2008) indicate that the European Union as a whole is less successful at attracting high skilled migrants than Canada, Australia or the USA. Moreover, immigration and ethnic or religious diversity are likely to raise additional demands on welfare states

¹¹ As with the Income Gini, the EGC ranges from zero to one, higher values reflecting a less equal distribution. An EGC of zero means that the entire population attains the same education level, regardless of high or low.

in terms of integration of the foreign born population, and it will in all likelihood also reframe the debate on equal opportunities among different groups of the population. *Horvath and Huber* (2013) highlight that besides networks and segregation ethnic diversity may have effects on labour market integration of foreign born. Insufficient integration and low skills cause above average unemployment rates and below average employment rates of immigrants.

Against this background, it is essential to have good projections on both the quantity and the composition of migration flows. While a large body of literature is devoted to understanding the impact of the structure of migration flows on welfare states, much less is known about the likely development of the country and education structure of migration in terms of forecasts. Area 1 research by *Crespo Cuaresma et al.* (2013B) develops a new method that allows assessing global migration flows using the fact that available net migration rates are nonlinear aggregates of bilateral migration flows. Their results imply that matching the skills of migrants with the needs of the European labour market so as to efficiently make use of the potential of migration may require targeted policies in destination countries. To reduce a skill mismatch in European labour markets and improve the integration of migrants, programs aimed to adapt the skills acquired in source countries by immigrants are proposed.

The general public debate on immigration has increasingly focused on its effects on the welfare state, amid concerns that immigrants may be a fiscal burden. Especially the low-skilled may be attracted by generous benefits, and generosity of the welfare state may also affect the skill composition of immigrants differently. Irrespective of qualifications and ethnic composition, immigrants of almost all ethnicities face substantially lower chances of being employed and a higher likelihood of being unemployed as well as of being over-qualified in their job than natives with similar characteristics. Area 1 work by *Nowotny* (2015) and *Janger and Nowotny* (2013) suggests that countries aiming to increase the share of highly skilled immigrants should focus on facilitating labour market access as well as facilitating access to nationality while limiting the role for family reunion, for example via a system that awards points for educational attainment. Whether the welfare system should be more or less generous to attract highly skilled relative to low-skill migrants remains an open question. Research by *Huber and Oberdabernig* (2013) also provides new and detailed insights on the welfare dependence of European immigrants. A large part of the differences between natives and immigrants in either benefit take-up or benefit levels can be explained by observable characteristics, mainly age and education. Once these are taken into account, the empirical analysis shows that immigrants tend to receive benefits as often, or less often, than natives and that the size of such benefits tends to be comparable or lower.

The skill mismatch, however, is often amplified by inadequate policies in European countries. For example, *Schneebaum et al.* (2014) provide evidence that intergenerational educational immobility is particularly pronounced among immigrants. Within this group a striking gender difference impedes educational advancement of females to a considerably larger extent than that of males. If no counteracting policies are undertaken, the current educational attainment of immigrants will substantially determine education levels of second generation migrants; the potential of immigration to contribute positively to the sustainability of European welfare states is therefore strongly underutilised.

From a policy perspective, careful analyses of the migration flows and the future requirements of European welfare systems, provide further recommendations (*Crespo Cuaresma et al.*, 2015B: 21-26):

- A large degree of heterogeneity across European countries is evident. The comparison of the expected impact of migration on the future age structure identified a considerable gap between EU15 (accession pre-2004) and EU13 (accession 2004 or after) countries. Making Central and Eastern Europe an attractive destination for migrants needs to be one of the important elements of policy efforts.
- Redistributive policies impact on the number and the skill composition of migrants to European countries. More equal countries exhibit lower relative deprivation, which in turn appear to be favoured in particular by secondary and tertiary educated migrants.
- As total fertility rates of migrant women are higher than those of native women an increase in the relative share of second generation migrants can be expected. High intergenerational immobility of education, in particular among female immigrants and immigrants from non-EU countries, impedes educational advancement of the descendants of parents with low educational attainment.
- Especially promoting access to vocational training constitutes a cornerstone of the policy package aimed at improving beneficial spillovers of migration. To avoid brain waste and overqualified migrant work, matching educational background of migrants and employment in an efficient manner is a key requirement. Targeted policies, such as language courses, and transparent systems of recognising foreign qualifications help.
- The chances of immigration relieving pay-as-you-go social security systems hinge crucially on whether migrants manage to integrate in the labour markets of host countries. European integration policies have to focus on: (i) selecting and attracting migrants that are willing and capable to integrate in the host countries' labour market, (ii) devising appropriate regional policies to support integration and potentially also influencing the settlement structure of migrants and (iii) adjusting the institutional structure of the economy to improve integration.
- In addition to these policies, however, the issue of what to do with those who are already here and will continue to be, is of importance. The challenge is how to make them an important source of human capital by appropriately integrating them into training programs and identifying and acknowledging their competences.

Hence, institutional changes are necessary with respect not only to the recognition of the formal education of immigrants, the integration of immigrants into education systems and the degree of educational mobility of first- and second-generation immigrants. Both skill recognition of foreign-born as well as educational integration of second-generation immigrants are closely interrelated with the organisation of national education systems. On the other hand, the role of labour market institutions needs to be reviewed. *Huber* (2015) suggests that labour market outcomes of immigrants relative to natives tend to be worse, after controlling for compositional effects, in countries with more centralised wage bargaining, stricter product market regulation and higher union density. Thus, labour and product market regulations need to be aligned to the goal of successful integration of immigrants into the labour markets of host countries.

2.3 Synergies, tradeoffs and reform implementation challenges

The financial constraint for welfare states in times of reduced GDP growth

European welfare states are confronted with increasing political demands to address old and new policy challenges. The overall reform purpose is not only to maintain current welfare levels and arrangements but frequently a substantial overhaul of structures. As governments have a serious imperative to improve competitiveness and to consolidate public finances, such changes can be managed obviously only if supported by a retrenchment of costly and inefficient policies, or an abolition of outdated policy strategies. In any case, a first and fundamental tradeoff originates in the fact that in most EU member states the potential to further increase spending and raise tax revenues is severely limited.

In that respect, a general slowing-down of economic growth in Europe, as indicated by both lower actual and potential GDP growth rates in advanced economies in the aftermath of the recent crisis, or as compelled by the ultimate need to reduce emissions to stay within global ecological limits, certainly causes a tightening of fiscal constraints.¹² Welfare state reform, then, is more about a reallocation and redirection of increasingly scarce financial resources within the state sector than to devote more money for numerous additional government purposes.

However, slower growth also further limits a potential (and empirically disputed) pro-poor trickle down mechanism to reduce inequality (e.g. Aghion and Bolton, 1997). It increases economic and political uncertainties stemming from more vigorous re-distributional struggles, especially when lower growth is accompanied by higher unemployment.¹³ Yet, as recent research by the OECD (Cingano, 2014), the IMF (Ostry et al., 2014) and the contributions in this project have shown, reducing market income inequality through adequate policy measures possibly also boost economic growth, pointing to the existence of both tradeoffs *and* complementarities between reducing inequality and promoting economic growth.

Evidently, certain reforms of tax structures in European countries may be suitable to generate higher revenues and simultaneously contribute to social inclusion, growth and competitiveness, or environmental goals. Tax systems are not only designed to generate receipts to finance public expenditure but they can also be used as instruments to promote equity, or to address other social and economic concerns. Hence, tax policies can play a major role in improving the post-tax income distribution, and policy options for reforming the overall tax mix (including social security contributions) in developed countries to improve the growth-friendliness of current tax structures have been analysed extensively (e.g. OECD, 2010). Provided that tax increases are necessary or unavoidable, a sustainability-friendly approach would aim to reduce tax-induced distortions, including a closing of tax loopholes, to shift towards consumption instead of income based taxation,

¹² Following an A-growth strategy, removing the GDP growth constraint (e.g. van den Bergh, 2014) may have similar implications as long as tax revenues are based directly or indirectly on GDP developments.

¹³ Also a "Green Growth" strategy can be associated with increasing unemployment. See Area 2 work by [Rengs et al.](#) (2015). [Licht and Peters](#) (2013) however do not find evidence that new products with environmental benefits for consumers are produced with higher or lower efficiency than old products. Hence their results indicate that both environmental and non-environmental product innovations can stimulate employment growth.

to raise more (residential) property taxes and to reinforce the old idea of 'Pigou taxation' (Pigou, 1920) to correct for consumption and production externalities and to internalise environmental damages via 'green taxes'. The latter may however have adverse distributional consequences: carbon taxes will almost certainly burden the poor, who usually spend a greater proportion of their income on energy.

Against this background, the identification of possible synergies and tradeoffs between welfare state reform requirements and other goals of a wide-ranging socio-ecological transition are of tremendous importance for at least two reasons: First, the design of an 'optimal policy' strategy for a welfare state transition certainly depends on the degree of complementarities of aspired goals. Second, tradeoffs and synergies may be exploited by ambitious policymakers when it comes to the political reform implementation and overcoming resistance to change.

Welfare state reform, 'new competitiveness issues' and life satisfaction

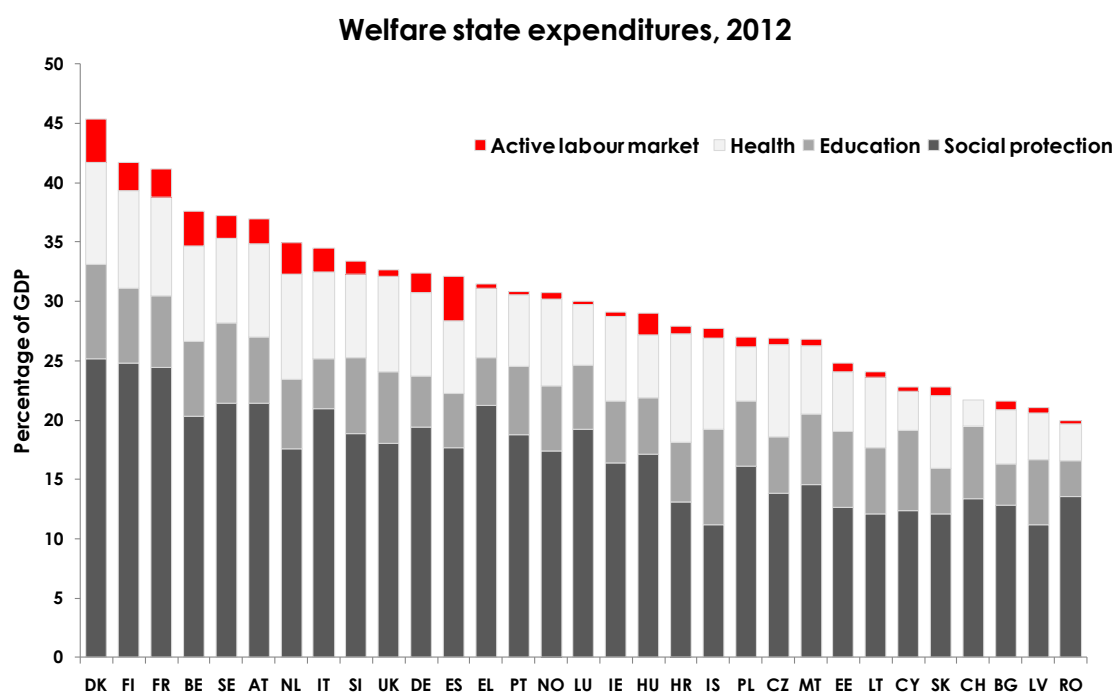
Taking into account the general economic constraints concerning scarce (financial) resources to fund public expenditure, a fundamental tradeoff is related to the division of social spending between 'productive' and forward-looking social expenditure for education and health on the one hand, and 'backward-oriented' ('repairing') social spending on pensions or unemployment on the other. While the need for a well-functioning social safety net is undisputed – to insure against 'old income risks' and to provide a sound financial basis for equality of opportunities – main Area 1 recommendations emphasize social investment spending for education (including training for displaced workers and other forms of active labour market policy to improve adaptability) and health to preserve and increase the quantity and the productivity of labour by raising healthy life expectancy, and as a value itself. Although cross-country comparisons of expenditures should be only interpreted with caution, as some countries treat transfers to be taxable income while others do not (Adema et al., 2011), Figure 12 illustrates significant differences across countries as regards public spending on passive social protection and active strategies.

Certainly, to set a stronger focus on such 'productive' welfare spending is in line with a broader vision of competitiveness that is also an integral part of a New Growth Path for Europe, and in which social investment and welfare are not seen as mere 'cost factors' (Aiginger et al., 2013). In that respect, one may distinguish 'enabling' and 'corrective' strategies. Policies related to education and training, lifelong learning and childcare institutions increase capabilities and economic productivity, whereas government spending on unemployment benefits or pensions may alter the 'market' distribution of incomes, but are less appropriate to increase productive capacities.

An even more general assertion is that better health and education do not only contribute to income-related goals, but that they also matter for individual wellbeing and life satisfaction, as the relevant literature has shown repeatedly (e.g. Frey and Stutzer, 2002; Tichy, 2013). Gender discrimination also appears to be negatively related to wellbeing. Measures to reduce gender discrimination hence are not just conducive for growth-related goals and improved equality of opportunities, but also play a role for increased overall life satisfaction, although admittedly the empirical results for this relationship are less robust. However, the literature on the role of income inequality for subjective wellbeing comes to ambiguous results (Helliwell, 2003). Alesina et al. (2004) argue that individuals tend to be less satisfied with their lives if inequality is high, but this effect is

much stronger in Europe than it is in the United States. Also, the poor in the EU are less happy when inequality is high, while this phenomenon is not so evident in the USA. Bjørnskov et al. (2010) reject the standard argument that more redistribution and less income inequality leads to an increase in welfare of the average person. In terms of happiness there may be a substitution effect between having institutions which permit fair market competition and social mobility, on the one, and redistributive government activities, on the other hand: the latter are essential if actual social mobility is low but fairness perceptions are high. All in all, while income inequality in developed nations appears almost unrelated to country level happiness averages, there still remains the fact that in developed countries there is a strong correlation between income inequality, health and social problems (Wilkinson and Pickett, 2009), although the evidence that income (wealth) does have a causal impact on health in adulthood is rather weak (O'Donnell et al., 2014).

Figure 12 **Welfare state expenditures: Government spending on social protection, health, education and Active Labour Market Policies (in percent of GDP), 2012**



Source: Eurostat.

Welfare state reform and the ecological transition challenge

Any strategy to cope with the global challenges of climate change has social and distributional implications and is thus also expected to impact on welfare state structures. The first and most obvious effect is through a shrinking tax base: For example, if environmental policies require a substantial reduction of GDP growth to curb CO₂-emissions, the financial base of most welfare systems is also tightened (see above). However, implications of climate change for future welfare state tasks go even further (Gough and Meadowcroft, 2011). Ecologically motivated price increases, for example electricity prices, disproportionately impact on lower-income households. Mitigation

policies are hence frequently perceived to have regressive effects as they are putting a higher adjustment burden (in relation to household income) on the poor than on the rich, regardless of their funding scheme. Policy responses to climate change and efforts to mitigate consequences will always create 'winners' and 'losers'. Again additional welfare policy measures may be required to deal with adverse distributional consequences.

Global warming will be associated with higher temperatures, a rising sea level, and more frequent extreme weather events. One may, therefore, think of new risks that welfare states will have to deal with, which are directly emerging from climate change, for example an increasing incidence of floods, droughts, or violent storms. In general, this will create new challenges for (social) insurance. Questions however go far beyond problems of assistance in the case of experienced harm but also include challenges for climate-change induced interregional or international migration, or adaptation policies to mitigate the damages. The central challenge will be to make the adaptation to climate change socially bearable. If energy becomes a more highly-priced (and valued) scarce resource, challenges of redistribution may be related to energy use in private households. For the organisation of such a redistributive scheme one may rely on more traditional tax and transfer schemes. However, it may also be a thought of a "more explicit distribution and redistribution of carbon" (Gough and Meadowcroft, 2011). An innovative and market oriented way to do this could be through some form of personal carbon allowances and trading.

An open question, certainly, is how even growth-friendly measures for social inclusion, e.g. Active Labour Market Policies or alternative education-based strategies impact on (global) environmental goals, and vice versa. In any case, a large-scale redistribution of jobs will result from ambitious climate policies. Some business sectors (e.g. coal mining) will probably decline, but for many other economic sectors one will simply observe that (new) green technologies will be employed. Waste management and agricultural production of fuels are likely to generate some low-skills jobs, but in general a decline in physical low-skills employment should be anticipated (CEDEFOP, 2009). There is yet only little empirical research on changes in the demand for green skills. A greener economy will surely observe changes in the demand for certain skills, and education and training policies will have to address these issues in order to prevent gaps in workforce know-how. Policy measures to increase labour market mobility and skill development should be responsive to employer demand, and training programmes should be continuously adjusted. As an increasing number of jobs require green skills, labour and social policy systems should accommodate that shift (OECD, 2015). A new green technological paradigm will also stimulate the appearance of new occupations, and novel combinations of existing knowhow (Autor et al., 2003). CEDEFOP (2009) and Vona et al. (2015) explicitly mention engineering and technical skills involved in the design, construction and assessment of technology, science skills from physics and biology, management skills related to change in organisational structure required to support green activities, and law and monitoring skills. Thus, it appears that a greening of the economy boosts demand especially for high skilled labour, which requires investment in formal education. However, demand for lower skills will probably not increase during a green transition. This makes potential distributional consequences even more socially problematic, and is likely to encounter political opposition. In that respect, it is not obvious whether an ecological transition is a more difficult challenge in countries with extended welfare states, as they may be the best device to smooth these frictions.

Addressing the political reform implementation challenge

Over the last 20 to 30 years, a substantial academic literature contributed to the understanding of obstacles and pathways to reforms in democratic regimes. Policy persistence is often said to be rooted in institutional factors of the political decision-making process, whereas successful implementation of welfare reforms is often attributed to a crisis-type culmination of economic problems. In particular conventional wisdom states that cutbacks of social benefits and welfare services, an upward adjustment of the retirement age, or easing of labour market regulations carry with it electoral risks for the incumbent government (Pierson, 1996; Allan and Scruggs, 2004; Buti et al., 2010).

Welfare state reforms address highly sensitive domains. Many people and interest groups are affected by the regulations of pension systems, labour market institutions, health systems, etc. In modern welfare regimes, almost everyone has a stake in social insurance or redistribution schemes. On a very general level, all Area 1 results indicate that to the degree that policies are directed at removing social inequalities based on inequality of opportunity, re-distributional policies which follow a social investment approach are more likely to be conducive to growth and beyond GDP goals. Therefore, the frequently postulated tradeoff between efficiency and equity does not apply in general, but appears to be conditional, depending on the policy instruments that are used, and the concept of equality that is applied. Countries looking for growth-friendly social policies should primarily focus on measures to provide equal opportunities and avoid exclusion or discrimination on the basis of gender, ethnicity or other traits. While this may seem to be a rather trivial conclusion, available evidence on differences in outcomes according to such characteristics well-documented in the contributions of Area 1 (and many other works) do indeed suggest that member states still have room to improve.

Yet, even reforms with seemingly paramount win-win-characteristics would have to deal with political resistance, if one takes into account the financial constraints in European welfare budgets. At the heart of the political opposition against beneficial reforms lies the fact that any change of policies and/or institutions has distributional consequences. Welfare state reforms always create winners that are often difficult to make out, as (i) benefits of reforms are often diffuse, (ii) benefits frequently accrue not immediately but in the future, *and* (iii) they generate (often) well-identifiable and politically vocal groups of prospective losers.

An interesting case in point relates to immigration reforms (*Huber and Oberdabernig, 2015*). Scholars have focused on natives' concerns about cultural alienation, loss of national identity, threats to security, and economic impacts of immigration as sources of anti-migration attitudes. In particular the economics literature refers to a labour market channel, where opposition arises if immigration leads to more intensive labour market competition. As hostility against immigrants and asylum seekers particularly comes from modernisation losers, this will increase hostility further. A second source of opposition stems from the notion that immigrants disproportionately benefit from social security. In this case, depending on whether immigrants' additional social security claims are likely to be financed by cuts in social benefits to residents or through higher taxes, either current net recipients (low income natives) or tax payers and contributors to social security systems (high income natives) may be opposed to immigration, and the EU's principle of freedom of movement will be charged as the cause of the problem.

Carrying out reforms is generally a difficult and risky task for governments who aim to remain in office, even if the policy change is generally beneficial. The interactions of voters, politicians, interest groups, and the bureaucracy give rise to numerous impediments to reforms, sometimes even based on apparent irrationalities, including myopic behaviour, or the effects of loss aversion, endowment effects or other forms of status quo-bias (e.g. *Pitlik et al.*, 2014).

To calm political resistance, and to win popular approval for reforms, short-run compensation for those who are negatively affected from a policy change appears to be necessary. For example, the Nordic welfare reforms in the 1990s were probably eased by the fact that effective poverty protection provided compensation for losers from structural reforms. However, the design of compensation schemes involves a number of problems. A practicable strategy would be to soften losses of an abrupt policy change by extending the transition or by grandfathering clauses, where old rules continue to be applied for existing situations, and a new rule will apply to future cases. Such a gradual 'phasing out/phasing in' is frequently used in pension reforms. A risk of this approach is that all reform aims (not just 'pure economic' goals) may be excessively watered down by long adjustment periods and over-generous concessions. Also, carefully bundling reforms in different domains, such that potential losers from one reform are compensated by prospective gains from change in another policy domain, appears to be a promising strategy. Combining different programmes into a single package could be successful if complementary policy changes – like labour market and pension reforms, including old-age and invalidity schemes – are introduced simultaneously. Reform deals may be negotiable if opposing political sides concentrate on top priorities, while compromising on their secondary aims. Southern Europe with its well-known lack of effective protection against poverty is a good example for the need of a comprehensive reform approach. Welfare state reform packages should include measures to secure an effective protection of the subsistence level as a minimum guarantee for reform losers.

Successful reform implementation requires credibility of the authorities. Governments must be able to credibly convey that they will stick to long-term policy goals, changes will not be reversed, and compensation promises will not be broken. From an economic standpoint, citizens and companies must be convinced that the reforms will be introduced as announced, since adjustment often requires up-front investment in physical or in human capital. If a policy change is unexpectedly reversed, the previous investment becomes (partly) obsolete. Indeed, if investors expect reversals they will wait-and-see, and adjustment may be disappointingly slow. A mere promise to compensate losers of a reform will have no political impact if voters distrust politicians' promises. This points to the substantial handicap of any reform strategy in countries where trust has eroded. Voters need a minimum confidence into their democratic institutions in order to accept the uncertainties involved in far-reaching institutional change. Lack of trust in political actors must be replaced by credible institutions. Governments willing to reform can demonstrate commitment and self-restraint by adopting tight rules and procedures, preferably put down in harder-to-change constitutional law. The binding budget rules stipulated by the Fiscal Compact serve as a role model in this respect. Another example of such binding rules is offered by pension reforms: The introduction of life-expectancy factors in pension reform laws which provide for automatic adjustment of the retirement age can help to keep discussions about reform reversal out of the political sphere.

A central factor for reform success concerns fairness issues. Policies are accepted more readily if regarded as 'fair'. Norms shape codes of behaviour and general views of what is 'desirable' and 'right'. Fairness does not refer exclusively to equality of outcomes, e.g. the distribution of income, wealth or opportunities. Merit, impartiality and unbiasedness of political decision and economic implementation procedures matter at least as much (*Andréasson et al.*, 2013). Increasing inequality following a policy change can be a crucial impediment to reforms if it is perceived as a result of an unfair process or not based on merit; it matters even more if the terms of burden sharing are also decided according to mechanisms deemed unfair. In this context, fundamental beliefs about underlying sources of inequalities matter for preferences for redistribution. If people get the impression that markets generally produce unfair outcomes, they desire more corrective intervention. Similarly, individuals who have the impression to control their own life course are less favourable toward redistribution (*Pitlik and Kouba*, 2013).

Social trust plays a major role in more than one sense. It is deemed to reduce the cost of control against cheating on benefits and taxes, facilitating a less costly provision of social services. Social trust also reduces the need for regulatory intervention, for example on labour markets (*Pitlik and Kouba*, 2015). While the direction of causality still remains an unresolved issue, lack of general trust and governance problems like corruption go hand-in-hand. Thus, in trusting societies the perceived fairness of political procedures is higher. The relatively smooth reform process of Nordic welfare states points to the relevance of high trust levels in Scandinavia. By contrast, trust levels are notoriously low, e.g. in Southern Europe, which may help to understand the particularly high reform obstacles in the Euro periphery (e.g. *Heinemann and Grigoriadis*, 2013).

2.4 Some final remarks

As welfare systems are integrated in institutional settings, any concept of welfare state reform in Europe has to acknowledge the variety and heterogeneity of economic systems. Irrespective of general observations it should be acknowledged that member states of the European Union have largely different experiences with reforms and are also characterized by different reform needs. Historical and social preferences with respect to the form of governance and the extent of government activity establish typical country clusters within various "worlds of redistribution" (*Schweickert et al.*, 2013; *Scharle et al.*, 2015). Some systems appear to have addressed employment and social challenges far more effectively than others.

Yet, a big government in Nordic states can be shown to have similar implications for economic growth compared with a low level of government activity in the liberal Anglo-Saxon cluster. This also demonstrates that strong preferences for redistribution and welfare spending do not necessarily imply all-embracing economic and social regulation, as is the case for Continental and Southern European systems. At the same time, a similar level of intervention into the economy is likely to have different growth implications in liberal as compared to coordinated market economies, i.e. a complementary institutional framework has to be in place and one size does not fit all (Beckmann et al., forthcoming). Concerning effects and determinants of government activity, the divide between prototypes of economic systems and related welfare states figure more prominently than an East/West divide (*Ademmer et al.*, 2014).

Despite these general caveats a common bottom line for the design of future welfare systems in Europe can nevertheless be identified from Area 1 research. Required measures should

- aim at targeting employment and activation instead of unemployment,
- focus on human capital formation, with a focus on access to education and vocational training,
- re-conciliate work and family issues to foster gender-equality and
- privilege productive social expenditure for education and health to the repair of damages.

Against this background, a (partly 'green') social investment approach appears to be both a suitable and feasible option for European welfare state reform. A strong focus on strengthening adjustment capacities of households through activation, learning and life-long human capital development is of major importance in a rapidly changing economic and social environment. Thus, social investment is compatible with more than just one single future scenario. To be sure, it is not a stand-alone strategy and has to be complemented by tax and regulatory reforms, and coordinated with traditional pillars of social security, especially with the pension system.

2.5 References

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KEY INFO

- Area 2 examines how to achieve a transition to a low-carbon economy with the aim of simultaneously solving problems of employment, equity and sustainability.
- Moreover, it studies potential conflicts and tradeoffs between economic growth and environmental challenges such as climate change or resource scarcity, while also taking into consideration the impact of financial instability.
- Several theoretical and empirical background studies address a wide range of topics, such as, for example, resource use scenarios for Europe or the feasibility of green growth and decoupling.
- Four complementary policy models aimed at combining economic, ecological and financial aspects are introduced, while addressing distributional and environmental challenges.
- While bearing the insights of sustainability transition studies in mind, Area 2 proposes a policy mix consisting of environmental regulation (e.g. taxation) and technological support, and discusses related policy challenges. Additionally, the importance of addressing financial and investment dimensions with adequate policy is highlighted.

3. CHAPTER AREA 2: ANALYSING POLICIES FOR A TRANSITION TO A LOW-CARBON ECONOMY

Jeroen van den Bergh (UAB)

3.1 Introduction

This chapter studies the potential conflicts and tradeoffs between growth and environment, and how to make a transition to a low-carbon economy with the aim to solve simultaneously employment, equity and sustainability, notably climate change, challenges¹⁴. It combines insights from mainstream and heterodox macroeconomics with environmental economics to arrive at creative strategies to solve unemployment and sustainability challenges simultaneously. Indicators of social welfare are used that include environmental concerns, develop several models to analyse behaviour of relevant stakeholders and their likely responses to transition policies, and formulate a transition policy mix consisting of environmental and innovation policy instruments. The models that were developed include a disaggregated multi-country European CGE model, a dynamic macroeconomic model, a multi-agent evolutionary model, and a model combining aspects of the latter two approaches. Each of these is able to deal with particular aspects of a sustainability transition and policy.

One of the clearest lessons from the financial crisis is that a narrow focus on economic indicators and policies was insufficient to avert the potentially disastrous consequences triggered by weaknesses in the US housing market and the subsequent collapse of Lehman brothers in September 2008¹⁵. The fragility instilled within the financial system as a result of over-heated asset

¹⁴ The chapter reports the results of research undertaken in Area 2 of the WWWforEurope project.

¹⁵ An additional problem is that many financial indicators that were closely watched, such as credit ratings, were flawed. Witness AAA ratings of toxic assets.

markets, over-leveraged balance sheets, and over-complex financial instruments went largely unnoticed in a policy environment that focused primarily on aggregate indicators such as the GDP, employment rates, inflation and consumer spending.

These oversights amount to a systematic failure to integrate a coherent description of the financial economy into models and policy prescriptions for the real economy (Bezemer, 2010; Keen, 2011). The crisis revealed painfully that the apparent economic success of the 'great moderation' was largely built on a growing fragility in the balance sheets of firms, households and nation states (Barwell and Burrows, 2011; Koo 2011). But these risks remained invisible to most economists and unpredicted by the majority of economic models. In the wake of the crisis, economists have therefore placed a renewed importance on the task of understanding the behaviour (and in particular the stability or instability) of the financial economy and integrating this understanding into the functioning of the real economy. A host of new research initiatives and the re-emergence of some earlier schools of thought bears witness to this new turn in economics (Keen, 2011; Minsky, 1994; Turner, 2013; Wray, 2012).

In view of the combined environmental and financial crises, the new challenge for economics is to combine models of economic instability (crises) with those of the environmental and natural resource impacts of, and feedbacks to, the economy. However, one important shortcoming of traditional economic models is the failure to account properly for the stocks and flows of natural resources on which economic activity ultimately depends. The period of the great moderation also witnessed a progressive decline in environmental quality across the world: in particular, in relation to global climate change, biodiversity loss, the deforestation and desertification of semi-arid regions, the eutrophication of water supplies and the over-exploitation of mineral resources (MEA, 2005; MGI, 2013; Rockström et al., 2009; TEEB, 2010; IPCC, 2014; Steffen et al., 2015). This limitation is well-rehearsed in the literature from ecological economics (Daly, 1972; Meadows et al., 1972; Costanza, 1989; Daly, 1996; Costanza et al., 1997). But attempts to redress it in macroeconomics have been partial at best.

One of the reasons for economics being incapable of tackling environmental challenges well is a fundamental dilemma which haunts debates about a sustainable economy. Conventional formulations for achieving prosperity rely on a continual expansion of consumer demand. More is deemed better in the received wisdom, even when the wellbeing outcomes from increasingly material lives are tenuous. Expanding consumer demand for material and energy using goods and services increases the global throughput of these, in turn threatening the sustainability of the ecosystems on which prosperity depends. Continued growth of the kind seen hitherto is patently unsustainable.

On the other hand, slowing down, or reversing economic growth appears unpalatable too. Income growth is clearly still needed in the poorest countries at least, where it is highly correlated with real wellbeing outcomes. Even in the richest economies, growth in GDP is regarded as the single most important policy indicator of progress. When growth falters, as it did in the crisis of 2008/9 incomes fall, high-street spending is reduced and production output falls. Businesses have less to invest, governments have lower tax revenues, social investment is withdrawn, people lose their jobs and the economy begins to fall into a spiral of recession. In short, growth may be unsustainable, but de-growth appears to be unstable.

Responding to the dilemma of remaining within environmental limits in a growth-based society has often been construed primarily as a task that governments can address with conventional fiscal instruments of tax and subsidy. The 'external' costs associated with environmental and social factors should be 'internalized' in market prices, according to familiar axioms (Pigou, 1920; Pearce et al., 1989; Pearce and Turner, 1990; Ekins, 2000). Incorporating 'shadow prices' for environmental goods into market prices will send a clear signal to consumers and investors about the real costs of resource consumption and environmental damage, and incentivize investment in alternatives, according to this conventional wisdom.

But this prescription has been hard to implement over the last decades. Fears of damaging economic growth have led politicians to shy away from both ecological taxation and green investment. Recent attempts to overcome this fear have largely focused on arguing that the impacts of green investment will be either negligible or even positive in terms of stimulating growth (Global Commission, 2014). But it remains an uncomfortable fact that fragile private and public sector balance sheets have slowed down investment in the real economy generally, let alone the less familiar investment needed to make a transition to a low-carbon economy. In addition, much business-as-usual investment has to be substituted, not complemented, by green investments. Conventional responses have focused instead on cutting public spending (austerity) and stimulating consumption growth (consumer spending) as the basis for economic recovery. Unfortunately, these responses tend to ignore the structural problems of the conventional paradigm and delay further the investment needed to make the transition to a green economy.

The scale and nature of this dilemma suggest that the combined challenges of climate change and resource scarcity require a fully consistent ecological macroeconomics in which it is possible to maintain financial stability, ensure high levels of employment, improve the distribution of income and wealth and yet remain within the ecological constraints and resource limits of a finite planet. An approach to macroeconomics configured only by 'real economy' aggregates such as output, productivity, employment, consumption and public spending, is insufficient to ensure economic sustainability, let alone social or ecological sustainability. Nor is it sufficient for monetary policy to consist largely in laissez-faire regulation of financial markets combined with central bank interest rate policy aimed solely at 'inflation targeting'. These forms of monetary policy were plainly deficient in averting the crisis and insufficient to provide recovery from it. For two decades before the crisis, this type of architecture had signally failed to provide a financial landscape amenable to the investment needs of a low carbon economy. Building a more appropriate financial system has to start from a clear understanding of the investment needs associated with the transition to a sustainable economy.

In order to deal with these challenges in the research reported in this chapter, a mixture of methods has been used, notably historical studies and developing a suite of innovative and partly complementary macroeconomic models, based on distinct theoretical assumptions to allow for a robust test of policies. In addition, insights from the recent area of transition studies are incorporated. The challenge is now to integrate macroeconomics with transition studies and to make macroeconomic models suitable to study happiness (real welfare) impacts of policies and scenarios, as well as to examine alternative strategies and scenarios like stringent carbon taxes, conventional peak oil impacts, technology support (subsidies), sharing work, and income

income/wealth redistribution policies. The research was guided by the following general research questions:

1. How can we combine the real and financial economy in a single model, in the context of ecological and resource constraints?
2. Can we identify feedback mechanisms between the environment and the macroeconomy, which European countries are likely to encounter?
3. Which role do GDP and alternative indicators play in policy advice that stimulates socio-ecological transitions to sustainability? For this purpose the interplay of generations, wealth, employment, biophysical resource use, social justice, and wellbeing is given attention.
4. Which policy package is needed to steer a quick and equitable transition to a low-carbon economy?

3.2 Core notions and issues to be addressed

Growth-versus-environment

Which reductions in energy use (or better energy use causing serious emissions of greenhouse gases) will be required for a sustainable path? Based on the literature, *Antal and van den Bergh* (2014) estimate the reduction requirement for reaching a safe concentration of CO₂ in the atmosphere, namely the IPCC 450 ppm goal which is associated with the target of limiting global average temperature rise to 2°C. This requires an 82% (annually 4.5%) emission reduction until 2050, if per capita GDP increases by 1.5%. Even with zero economic growth, still an impressive 67% intensity reduction (3% per year) is needed. These reductions are net of all kinds of undesirable indirect effects (often called rebound). They represent unprecedented challenges, which illustrate the potential conflict between growth and environment, or growth being a risky strategy from an environmental angle. This suggests that the policy priority given in rich countries to growth in effect means putting little weight on environmental issues in policy. An effective green growth strategy would require clarifying how the challenge of reducing CO₂ emissions with 82% until 2050 is feasible.

For this reason, a broader range of aspects including employment (or reducing unemployment), equity and environment are (or should be) the goals to focus on for politics and research. This is also reflected in indicators of a welfare (or wellbeing) approach (*Kettner et al.*, 2012, 2014). Growth is at best a means, but perhaps not even longer so given all kinds of seriously constraining conditions, such as the need for stringent climate policy in the form of carbon pricing or the often underestimated importance of energy for past growth which suggest it is very difficult to substitute away from high energy use. In the absence of a rapid improvement of net, average energy efficiency, the two previous constraints mean a sharply rising cost of production and possibly a lower rate of growth. Moreover, past growth has been partly due to financial and housing market bubbles. One should further take into account diminishing returns to technology, and aging populations in many European countries. Furthermore one should add that in the case of the current crisis, with some south-European countries having unemployment rates of above 20%, it will be difficult to recover employment without growth. But it should be realized that the WWForEurope project is not strictly focused on, or limited to, the current crisis context. It studies a more general (non-crisis)

context in which unemployment percentages are generally much lower. Then there is more room for policies that protect employment and the environment without requiring necessarily high growth. In this case one effectively needs to not only decouple environmental pressure but also employment from income growth. This twofold strategy can be seen as sort of precautionary. For clarity's sake, it certainly is not meant to be an anti-growth (zero- or degrowth) strategy, as growth is not the direct focus but instead environment and employment (*van den Bergh*, 2015).

Many authors argue that we are at a breaking point in terms of energy, climate change and the economy. Treating environmental issues rather separately from employment issues has been the strategy of macroeconomics and economic politics/policy. Talking easily about sustainable growth continues this line of thinking and avoids accepting, and struggling with, the enormous challenge discussed above. Macroeconomics seems to be overwhelmed by the current economic-financial problems – understandably – and is dominated by internal debates about the best explanations, theories and models. The mainstream debate is about pure economics, neglecting environmental, energy and equity factors, because the economic-financial issues by themselves create already so much food for thought and debate. It is further motivated by the widespread belief that absolute delinking of growth and environmental pressure – or euphemistically "green growth" – is feasible. It is not enough to point at decoupling having occurred for some environmental substances in some countries and periods. It should be realized that green growth requires decoupling in all environmental dimensions, which is a huge challenge.

Some optimists may point at the research on environmental Kuznets curves (EKC), but its results rightly summarized indicate that no delinking has occurred for serious environmental issues (global warming, biodiversity loss). EKCs have only been found for a subset of environmental indicators, mainly related to partial, local, short-term and flow issues. Often these involve problems associated with human health as this is the understandable immediate concern of voters and politicians (e.g. water quality and emissions of particulate matter in cities). Moreover, diminishing returns are found for other problems (e.g. acid rain was rather successful but reappears with continued growth). Finally, the EKC research is typically partial in nature, and does not take into account the shifting of environmental problems. This is perhaps not immediately a reason to become pessimistic but it should seed some sentiment of precaution about what growth and policy can accomplish.

Antal and van den Bergh (2013) suggest that next to mainstream economics heterodox perspectives deserve serious attention, notably those that try to realize welfare, employment and environmental conservation without relying on continued average income growth. No view or idea should be excluded in an open research project that aims to tackle these huge challenges. An unprecedented level of creativity and lateral thinking are needed to come up with credible solutions to the interlinked problems of unemployment, inequity and environmental risks. To deal well with this issue, relevant indicators of environment and social welfare are needed, as discussed above.

Another view of course is that we know the solutions already (see the answer to question 4), but that the problem is one of social-political acceptability. The task for us scientists is then explaining well the reasons to implement recommended policies, showing their overall positive and negative socioeconomic effects and arguing that the first are worth the latter. However, so far this approach has not had much positive effect.

Wellbeing indicators

Three studies have examined relevant social welfare indicators. In a first one, *Kettner et al.* (2012) present a list of wellbeing indicators and indicator systems which go beyond the narrow concepts of national economic accounts. The indicator list is the result of a review of suitable dimensions of wellbeing and sustainability with the aim of expanding the macroeconomic analysis by important dimensions so as to be useful for transition policy advice. Where appropriate, indicators differentiated by men and women are developed. The pool presented in this deliverable includes: Indicator Systems, Composite Indices and NAMEA and Material flow accounts. Some of the indicators will be included in the macroeconomic models in order to account for key dimensions of sustainability. This work forms a basis for more comprehensive representations of the social and ecological dimension in macroeconomic models. This may lead to a better understanding of synergies as well as conflicts between sustainability and economic growth.

Kettner et al. (2014) review four key approaches from sustainability science, happiness research and ecological economics. A short list of stock-flow indicators is developed that would be suitable for inclusion in macroeconomic models. The review of the four approaches reveals that while there are different starting points and foci, these can be useful in identifying key indicators of wellbeing and sustainability. In their paper, the authors also aimed at identifying data sources relating to the variables and indicators chosen and illustrated how this extended basis of socio-ecological indicators can be offered in such a way that it is conducive to integration in macroeconomic models.

In a third study, *van den Bergh and Antal* (2014) assessed proposed alternatives to GDP as a measure of social welfare or human progress. Four main categories are considered, namely ISEW and GPI based on corrections of GDP, sustainable or green(ed) GDP, genuine savings/investments and composite indexes. All these alternatives turn out to suffer from various shortcomings. Nevertheless, several of them represent a considerable improvement over GDP information in approximating social welfare. This gives support to the idea that we should not wait to give less importance and attention to GDP (per capita) information in public decision-making until a perfect alternative indicator is available.

3.3 Empirical background studies

Insights on behavioural regularities in recent transitions

A case study was undertaken by *Kaphengst and Velten* (2014) for the district Rhön-Grabfeld in Northern Bavaria (Germany), where several energy cooperatives were formed recently through the support and promotion of Agrokraft, a small rural consultancy, mainly with the aim to raise the added value of the region and to foster rural development. The case study was assumed to be a good example of a successful socio-ecological transition of rural areas both resulting from beneficial institutional frameworks (such as the Renewable Energy Act in Germany and cooperatives as the applied economic model) and the intensive engagement of individual people (so-called "frontrunners"). The results from the case study are complemented by and compared with two other case studies from Denmark and Spain taken from the literature in order to allow for some

general conclusions on the role of cooperatives in energy transition processes (see also the contribution of Area 5 in chapter 6).

The study mainly uncovers if and under which conditions energy cooperatives provide favourable structures for renewable energy development in rural areas. A particular focus lies on the role of frontrunners in energy transition processes and the motivations of the people to become involved in energy cooperatives. The study also investigated if and to what extent engagement in energy cooperatives fosters (environmental) behaviour change among their members.

The analytical approach of the study is embedded in the perspective on transitions to sustainable development (Grin et al., 2010), focusing on the Multilevel Perspective (MLP) delineating changes in socio-technical regimes (Geels, 2011) as well as Transition Management (TM) providing a governance framework for transitions (Loorbach, 2007; Loorbach and Rotmans, 2010), to be a comprehensive approach to analyse the dynamics and drivers of changes in regions, in economic sectors like the (renewable) energy sector and in the society as a whole. By linking transition experiments in rural areas to energy cooperatives and to behavioural change, this study is apparently the first of its kind.

Empirical data on dynamics, concepts and implementation of the transition towards renewable energies in the district were gathered during two site visits in Rhön-Grabfeld District (June and August 2013) where interviews with regional actors and the founders of several energy cooperatives were conducted. In addition, less actively involved people in energy cooperatives were asked via an online questionnaire about their own position in the process and about potential changes in their attitudes and behaviour caused by their involvement in a cooperative.

The case studies revealed some factors/characteristics that are crucial for the promotion of renewable energies in rural areas:

- legal framework favouring renewable energies over fossil energies, enabling a secure investment environment
- funding to support initial activities that do not yet generate income
- frontrunners deeply rooted in the region and of high reputation among population
- established networks of actors and stakeholders
- general attitude and willingness towards change among at least some parts of the population
- a simple, convincing and highly inclusive concept
- spaces and capacities for open dialogues

The case study further shows that, in addition to being a pure investment opportunity, energy cooperatives offer the opportunity for participation and engagement of local citizens and can therefore be seen as useful drivers of transitions. They increase acceptance of renewable energy installations by being open to all citizens in the affected region and generate profit for the community as well as for each individual. However, as the case study in Spain illustrates, a cooperative can also operate at a supra-regional level and offer its members some of the same benefits of smaller more local cooperative energy projects.

Concerning the potential of energy cooperatives in changing (environmental) behaviour, the results can be summarised as follows:

- It is mainly altruistic motives rather than profit-driven motivations that drive people to become a member of an energy cooperative.
- The most relevant behavioural change occurred in energy consumption and financial investments.
- While the engagement in energy cooperatives had an effect on the environmental behaviour of the members, for every field of behaviour at least two thirds of the respondents did not perceive an effect or were unsure.
- The gender balance of respondents and the level of activity in energy cooperatives clearly show a notable male dominance.

While the study revealed that cooperative structures could to some extent foster changes in behaviour towards more sustainable practices, these results are not yet consolidated and require more evidence from other contexts.

In conclusion, *Kaphengst and Velten* (2014) have demonstrated the high value of cooperatives in the economic and societal development of rural areas. While energy transition is the focus of this study, the strengths of cooperatives in transition experiments, namely their high potential for social inclusion, participation, capacity building as well as their contribution to foster local economies and to support community activities, can also be transferred to other transition contexts.

Policy makers should consider that sustainable transformation of energy systems is not only about diffusing the right technology but that action needs to take place at local levels with local conditions and requirements. Therefore, measures and programs should also support regional and local actors to build capacities through funding, to enhance skills through education and trainings, and to remove or adapt weak and unnecessary, historical regulations.

Resource use scenarios for Europe

A long bridge is required to span the gap between an environmental and a macroeconomic perspective on the future of human development. The analysis of socioeconomic resource use by *Fischer-Kowalski et al.* (2013) is an important pillar to support such a bridge. Still, the bridge has to be walked on from both sides. Attention for causalities is typically divided: Environmentalists care for how economies will impact upon the environment and that they potentially might trigger environmental changes detrimental to long-term civilization and survival. Economists care for securing the (typically much shorter term) conditions of economic growth, employment and consumption opportunities. Environmentalists see nature as a dynamic force, economists focus on the agency of humans. The differences in time horizons alone make it difficult to meet mid-way.

Within the limits of a socio-ecological framework, *Fischer-Kowalski et al.* (2013) tried to employ both perspectives. Drawing on existing literature, they describe global changes that will affect the European economies via biophysical effects, world market price effects for commodities and potential policy regulations, and on a macro-level, it analyses the impacts economies have on the extent of natural resource extraction and use, and concomitant environmental consequences. The most general take-away insight is that there is a strong interdependency: environmental change feeds and constrains the economies, and the economies trigger environmental change. It appears

that there is major structural change on-going in this relationship to which Europe will need to adapt.

Large-scale societal transitions in the past: The role of social revolutions and the 1970s syndrome

This volume contains two historical case studies of energy transitions, both on a macro level. The first case study, "The role of social revolutions in major historical energy transitions", focuses on the "take off" phase of the historical energy transition, that is on the transition from the biomass based agrarian to the fossil fuel based industrial energy regime. Major societal transitions are typically not incremental, but involve social turmoil and threats to established property and power structures. For a sample of 17 countries (more or less randomly selected for long-term data availability), *Fischer-Kowalski et al.* (2013) analyse the transition from an agrarian to an industrial regime in terms of energy, GDP, population growth – and the occurrence of revolutions, across the last four centuries. From the empirical case studies of revolutions between 1642 and 1949, the following lessons are derived:

The point in time at which revolutions occur is very early in the energy transition (at a level of 7% fossil fuels in the society's primary energy use, on average).

With all countries observed, fossil fuel use accelerates over time, and after an early statistical break the gradient of increase is always steeper than before (typical for "take off" situations).

There is no difference between countries with and without revolution in the gradient of fossil fuel use before the break. Thus the idea that revolutions happen in cases of more rapid change cannot be defended in the light of these data.

The energy transition gradient after the statistical break is higher in revolutionary countries than in the others. This is an indication that revolutions tend to accelerate the institutional change required to make a shift towards fossil fuels use.

A second case study examined the stabilization of energy and materials use in most industrial countries from the early 1970s onward (up to now). *Fischer-Kowalski et al.* (2013) interpret this as a late phase in the long process of industrial transformation and explore what was involved in bringing this change about. This departure from an energetic and material growth path was also connected to a certain delinking of economic growth and energy (Ayres and Warr, 2009). In most European countries (as well as in EU27 and OECD countries), domestic resource and energy use stagnated or even declined (such as in UK and Germany) since the early 1970s while economic growth continued, however at slightly lower rates. Denmark achieved a full decoupling between its economic growth and from fossil fuel use. From the 1990s onward, stagnating resource use in Europe was also connected to an international process of restructuring (i.e. changes in the geographical location of industries) that offered new opportunities to developing countries and it thus contributed to reducing global inequalities. Developing countries now pull the train of economic growth and increase in resource use.

This case study teaches the lesson that it is possible for highly developed industrial countries to live with stagnating (or even declining) domestic levels of resource use. But it is fair to say that this is partly due to a shift in patterns of international trade and associated production and resource use.

Sector-level tests of the feasibility of green growth: Carbon intensity versus economic and productivity growth indicators

Gazheli et al. (2015) present a sector-based approach to investigate whether green growth – combining economic growth with environmental sustainability – is feasible. Their approach considers the relation between on the one hand carbon dioxide emissions per dollar of output (called carbon intensity) and on the other hand growth in economic output and labour productivity, at the level of production sectors. Carbon intensity (CI) is calculated in two ways: as direct CO₂ emissions from each sector, which can be seen to immediately result from the processes in the respective sector; and as total, direct plus indirect, emissions, by using environmentally-extended input-output tables. The analysis covers Denmark, Germany and Spain for the period 1995-2007. The authors calculate correlations over time between sectoral CIs and a range of economic indicators: sectoral total and relative output, final demand, value added, and so-called output and valued-added productivity indicators, and their change. The findings are similar for the two types of CI indicators. The bad news for green growth is that relatively clean sectors do not seem to be more productive than dirtier ones, and neither show higher productivity growth. Sectors associated with high carbon intensity grew more in absolute terms than those with low carbon intensity. The share of these sectors increased suggesting that green growth requires a very rapid pace of decarbonization, or the economy as a whole to shrink. Longer-term sectoral growth on the other hand, as expressed by a change in value added, does not seem to be positively correlated with carbon intensity.

3.4 Four complementary policy models

The main challenge for macroeconomic modelling is to combine economic, ecological and financial systems and address seriously objectives associated with a sustainability transition. *Jackson et al.* (2014) provide some information on the modelling undertaken. They highlight modelling needs in relation to full employment, financial stability, and social equity under conditions of constrained resource consumption and ecological limits. Moreover they provide a broad overview of the literature relevant to this modelling work. The approach led by WIFO uses a Dynamic New Keynesian (DYNK) general equilibrium model to explore the implications of different long-run equilibrium paths for energy consumption. The approach led by Jackson's team (Surrey) in collaboration with York University is motivated primarily by the desire to integrate a comprehensive model of the financial economy into a model of a (resource and emission-constrained) real economy. A third approach by WU and UAB explores an entirely different approach using an innovative evolutionary, agent-based macroeconomic model for climate policy analysis. A fourth model, also by WU, develops a so-called Stock-Flow Consistent Framework model to evaluate five policy scenarios ranging from a low consumption scenario to a higher share of renewable energy.

3.4.1 DYNK general equilibrium modelling

Preparatory scenario design

The baseline for scenario calculations is the material consumption as provided by Eurostat for the year 2005. The authors did not choose a later year as this period of time is soon marked by the

financial crisis that induced a downward turn in resource use dynamics. This downward turn could be a once-off effect that will be (over)compensated in the following years, or it could reduce material consumption for the EU27 in the long run. Given this context four scenarios ("SEC-scenarios") have been developed:

Trend scenario: European high-income countries maintain their per capita material consumption of 2005. Low-density transitional economies converge with the level of EU15 low density countries. High-density transitional economies still grow for a short period and then they reduce their per capita consumption to the level of EU15 high-density countries. The rationale for this is that EU15 countries, as shown in the study, have already stabilised their domestic material consumption for quite a few years. In the trend scenario, they just continue with their 2005 per capita consumption.

Freezing scenario: All EU27 countries freeze their per capita domestic material consumption at the level of the year 2005. This scenario is supposed to serve as a reference for the other scenarios. It is analogous to the "high income" component in UNEP's trend scenario. The calculation just prolongs each country's DMC/cap¹⁶ from 2005 till 2050. To calculate the total material consumption the DMC/cap values were multiplied with the UNPD's population forecast (medium fertility variant, UNPD, 2011).

Best practice scenario: This assumes the domestic material consumption per capita to decrease in all EU27 countries as in the countries with the strongest decline observed since 1970. The feasibility of this scenario is justified by best practice of Germany, UK and France, which developed their economies while reducing their per capita material consumption at the same time¹⁷. Germany, UK and France as the biggest economies in Europe experienced a decrease of their joint per capita domestic material consumption of about 28% over the period from 1970 to 2004. This decrease was then applied to the baseline values of all EU27 countries as an annual percentage for the period 2006 to 2050. The assumption is that all European countries can emulate these large economies with respect to shrinking material demands, while these forerunners continue on their declining pathway.

Radical transformation scenario: The EU27 halves its per capita domestic material consumption until 2050. This is done by a simple geometric function applied to per capita material consumption rates of EU27 as a whole. This is a simple application of the "contraction" rule used in the UNEP (2011) moderate contraction and convergence scenario, asking high income industrial countries to halve their metabolic rates (while the rest of the world catches up to these rates). One could of course also apply a linear function. In its "roadmap to a resource efficient Europe" also the European Commission adopted such a strategy as one of a number of variants.

¹⁶ DMC/cap = domestic material consumption per capita.

¹⁷ For Germany this refers to a development that took off in 1970, so the German unification is only part of the explanation for Germany.

The DYNK (Dynamic New Keynesian) model

The DYNK model used at WIFO can be characterized as Dynamic New Keynesian and explicitly describes an adjustment path towards a long-run equilibrium. The term 'New Keynesian' refers to the existence of a long-run full employment equilibrium, which will not be reached in the short run, due to institutional rigidities. These rigidities include liquidity constraints for consumers and wage bargaining. Depending on the magnitude of the distance to the long-run equilibrium, the reaction of macroeconomic aggregates to policy shocks can differ substantially. Therefore, no automatic market clearing via the price mechanism in all markets is specified. The model describes the inter-linkages between 59 industries as well as the consumption of five household income groups for 47 consumption categories. Model closure is realized by endogenizing parts of public expenditure in order to meet public debt targets. The model covers the EU27, treating it as one economy.

Kratena and Sommer (2014) show macroeconomic results as well as results for energy and material use and GHG emissions from simulations with a DYNK (Dynamic New Keynesian) model for the EU27. Two different tax reform schemes have been analysed with this model in order to understand the options for dealing with the challenges of absolute decoupling, price competitiveness of European manufacturing and leakage: (i) the classical '*Green Tax Reform*' where GHG emissions and inputs of resources in production as well as in consumption are taxed on an increasing scale and social security contributions (employers' and employees') are reduced simultaneously so that (*ex post*) public revenue neutrality is guaranteed (ii) an '*Environmental Fiscal Devaluation*' where GHG emissions and inputs of resources embodied in private consumption (so not as in (i) production) are taxed at the same rate and on the same increasing scale as in (i) above, and revenue neutrality is achieved by the same rule for social security contributions as in (i).

The tax rates for GHG emissions have been determined in line with the EU Roadmap for a low-carbon economy, starting off with a tax rate of 25 €/t of CO₂ equivalent (in € of 2005) in 2015 and rising continuously to 250 €/t of CO₂ equivalent in 2050 (in € of 2005). The tax rates in the DYNK model for the three categories of minerals in the material flow database (i.e. minerals for construction, for industry and for metal production) have also been taken from other studies on resource taxation; they start with a tax rate of 2 €/t of domestic material extraction and imported materials and rise by 5% p.a. until 2050.

In the case of 'Environmental Fiscal Devaluation', the embodied emissions and resource inputs had in a first step to be quantified. The results of these simulations yield a rough one-point-in-time estimate of domestic emission contents for each consumption category, as well as domestic material consumption (DMC), i.e. the sum of induced domestic material extraction and induced material imports.

For 'Green Tax Reform', they find a positive mid-term impact for employment even in the case of negative output effects, driven by the negative competitiveness effects of unilateral EU taxation policies. In the long-run the simulation results of the DYNK model resemble those of a CGE model with no employment double dividend and the wage increases having almost completely compensated the decrease in labour taxation.

The results show potential synergies and tradeoffs between different environmental, economic and social policy goals. At the same time they also reveal the potential contribution of Europe to the global problem of resource use.

Price instruments (taxation schemes) that fully impute environmental costs to European consumers and producers lead to a loss in price competitiveness and to leakages of emissions as well as resource use. This may give rise to conflicts between different environmental targets. Though the leakage in terms of GHG emissions may be small, the relocation of production outside Europe significantly increases domestic material consumption embodied in imports. In the case of European unilateral action, the leakage problem can only be dealt with by directly addressing embodied emissions and resource use in European final consumption. A policy that fully includes environmental costs for European consumers and producers is more efficient in reaching environmental goals and achieves a huge amount of absolute decoupling, which is needed for a socio-ecological transition. Such a policy, although slightly reducing the average growth rate of GDP, may still have potential positive mid-term effects on the labour market.

Price instruments (taxation schemes) that put the full burden of environmental costs on the European consumer by invoking his global responsibility shift the demand from domestic to foreign sources. Such policy is not very efficient with regard to environmental goals and only achieves a smaller amount of absolute decoupling in the model results. Since it reduces the global environmental impact of the European consumer, it would lead to negative leakage.

Comparing the emission and resource use impact of both taxation schemes including leakage brings the global emission results closer together, but still Green Tax Reform is more effective in terms of the global environment.

3.4.2 The FALSTAFF macroeconomic model

This model is aimed at combining the real and financial economy in a single model, in the context of ecological and resource constraints. The purpose is to answer questions like: what is the best organisation and structure of asset portfolios and ownership; what is the best balance between public and private finance; what is the balance between equity and debt; what is the appropriate form of horizontal and vertical money supply; and what is the impact of elevated investments on prices, wages and consumer demand.

The framework

Over the last four and a half years, Tim Jackson's group has been working closely together with Peter Victor (York University, Canada) to develop an approach to macroeconomics which seeks to integrate ecological, real and financial variables in a single system dynamics framework (*Jackson et al.*, 2014; Jackson and Victor, 2014, 2015.) An important intellectual foundation for this work comes from the insights of post-Keynesian economics, and in particular from an approach known as Stock-Flow Consistent (SFC) macro-economics, pioneered by Copeland (1949) and developed extensively by Godley and Lavoie (2007) amongst others.

The essence of SFC modelling is consistency in accounting for all monetary flows. Each sector's expenditure is another sector's income. Each sector's financial asset is another's liability.

Changes in stocks of financial assets are consistently related to flows within and between economic sectors. These simple understandings lead to a set of accounting principles which can be used to test the consistency of economic models. The approach has come to the fore in the wake of the financial crisis, precisely because of these consistent accounting principles and the transparency they bring to an understanding not just of conventional macroeconomic aggregates like the GDP but also of the underlying balance sheets. It is notable that Godley (1999) was one of the few who predicted the crisis before it happened.

The foundation for their work is a macroeconomic model of Financial Assets and Liabilities in Stock and Flow consistent Framework (FALSTAFF), calibrated at the level of the national economy. The approach is broadly Keynesian in the sense that the model is demand-driven, and articulated in terms of six inter-related financial sectors: households, firms, banks, government, central bank and the foreign sector. The broad sector behaviours in the model are set out in the following paragraphs.

Households' marginal propensity to consume from disposable income and from net wealth are estimated from empirical data. Household savings are allocated between a range of financial assets (and liabilities) including bank deposit, equities, pension funds, government bonds (and mortgage and loans), using an econometrically-estimated portfolio allocation model based on the framework originally proposed by Brainard and Tobin (1968).

Firms' investment decisions are (currently) estimated using an econometrically estimated investment function, with independent variables including cash-flow, the loan rate, and the capacity utilisation rate of firms capital. Firms funding decisions are determined by an endogenous retained earnings ratio and an exogenously set debt to equity ratio.

Government spending is determined according to several exogenously defined strategies which can include forms of counter-cyclical spending or alternatively forms of austerity policy. Taxes are set mainly by an exogenous tax rate – although this can be changed under different policy scenarios to accommodate austerity or countercyclical spending. Government deficits are funded by the issuance of government bonds.

Banks accept deposits and provide loans (and mortgages) to households and to firms, and in the simplified models distribute all profits to households and are deemed not to accumulate capital. The *central bank* regulates the money supply through an endogenous interest rate and provides liquidity on demand to banks. Work is currently underway to extend the functioning of the central bank sector to the case of Eurozone economies, in which the national central bank is allocated an inflation target (and a money supply target) according to policy set through the European Central Bank.

Labour demand is determined endogenously in the model through a constant elasticity of substitution (CES) production function, in which the capital stock and aggregate demand (output) are given by the model, and the elasticity of substitution between capital and labour and the labour productivity can both be exogenously set. The CES production function can also be used to determine the split between wages and profits (on the assumption that the return to capital is equal to the marginal productivity of capital). Alternatively, the model can be configured to include an account of the power of capital (respectively wages) to command a greater share of income as

profits (respectively wages) using a simplified Phillips curve. Wage bargaining also sets consumer prices in the model.

Asset prices are established through supply-demand balances. For instance, the supply of equities is determined by firms' financing needs and their desired debt to equity ratio. The demand for equity is determined by household's portfolio decisions. The price of equities is then determined endogenously so that the supply and demand balance each other. In this way, FALSTAFF can model speculative asset ownership and its impact on prices, net worth and consumer demand (through the consumption function).

For the case of *government bonds*, the yield (interest rate) is currently derived solely from the bank rate using a historically derived interest rate spread. Capital gains from bond price fluctuations are not currently modelled. The supply of bonds is determined by government's borrowing requirement. Demand from households is set by the portfolio allocation function. Excess (or under) supply is assumed to be taken up by the overseas sector, whose capital account is balanced by bank loans (or deposits).

A core aim of the approach concerns the need to determine the implications of green investment for financial structure and macroeconomic stability. The level of green investment is set exogenously in FALSTAFF and calibrated against known policy targets and proposals for decarbonisation (and where available) resource decoupling and the protection of natural capital and ecosystem services. A key variable in the model is the assumed productivity of green investment and the degree to which it contributes to the productive capital stock. This is set exogenously in the model to allow the user to explore the implications of different scenarios. The FALSTAFF model was developed using the system dynamics software STELLA.

Results and outputs

The FALSTAFF model has so far been calibrated against national accounts data for Canada and for the UK. A working paper (Jackson and Victor, 2015) was presented at a research symposium convened by the Canadian International Governance Institute and hosted by the UNEP Finance Initiative in December 2014. The model is able to simulate a number of different scenarios with and without green investment and demonstrate the financial (and balance sheet) implications of these scenarios. A key characteristic of FALSTAFF is the ability to demonstrate stock-flow consistency through the satisfaction of fundamental accounting identities and the net lending positions of each sector. FALSTAFF can also be used to draw attention to financial imbalances between sectors.

The overall finding from this work suggests that green investment is not incompatible with goals of full employment and financial stability, even in the context of a slowing down of growth. At the same time, considerable care has to be taken to ensure that financial balances across sectors (and indeed across countries) are maintained. Some scenarios clearly lead to dangerous divergences in net lending positions.

A simplified version of the SFC framework was designed to explore Savings, Inequality and Growth in a Macroeconomic Account (SIGMA; Jackson and Victor, 2014). This SIGMA model is a

closed, stock-flow consistent, demand-driven model of savings, inequality and growth in a macroeconomic framework¹⁸. SIGMA has only four financial sectors in contrast to FALSTAFF's six: households, government, firms and banks. But in a variation of the FALSTAFF structure, the households sector is further subdivided into two subsectors (denominated as 'workers' and 'capitalists') in order to explore potential inequalities in the distribution of incomes and of wealth.

Scenarios carried out using SIGMA confirm that, under certain conditions, it is indeed possible for income inequality to rise as growth rates decline. However, it was also established that there is *absolutely no inevitability at all* that a declining growth rate leads to explosive (or even increasing) levels of inequality. Even under a highly-skewed initial distribution of ownership of productive assets, it is entirely possible to envisage scenarios in which incomes converge over the longer-term, with relatively modest intervention from progressive taxation policies.

The most critical factor in this dynamic is the elasticity of substitution, σ , between labour and capital. This parameter indicates the ease with which it is possible to substitute capital for labour in the economy as relative prices change. Higher levels of substitutability ($\sigma > 1$) do indeed exhibit the kind of rapid increases in inequality predicted by Piketty (2014), as growth rates decline. In an economy with a lower elasticity of substitution ($0 < \sigma < 1$), the dangers are much less acute. The ease with which capital can be substituted for labour is thus an indicator of the propensity for low growth environments to lead to rising inequality. More rigid capital-labour divisions on the other hand appear to reinforce the capacity to reduce societal inequality. A key policy conclusion concerns the need to protect wage labour, through adaptations in labour legislation and resistance by labour unions, against aggressive cost-reducing strategies to favour the interests of capital. This would have the additional benefit of maintaining high employment, even in a low- or de-growth economy.

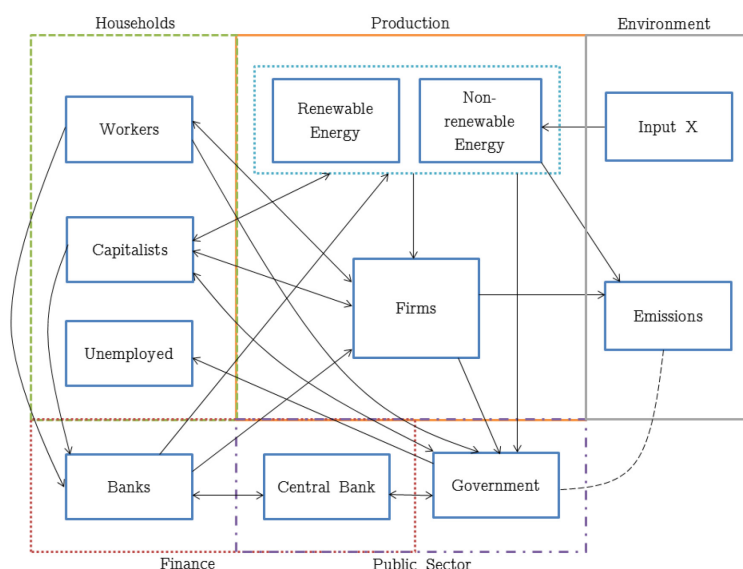
3.4.3 Modelling Growth, Distribution, and the Environment in a Stock-Flow Consistent Framework

In order to assess policies that address employment, equity and environmental challenges simultaneously, economic models need to account for both sector-sector and sector-environment feedbacks within a single framework. To deal with this challenge, a multi-sector macro model, somewhat in between the approaches of the modelling exercises reported in sections 3.4.2 and 3.4.4, is developed in this paper in a stock-flow consistent (SFC) demand driven framework (Godley and Lavoie, 2007) with supply side environmental constraints (Kronenberg, 2010; Fontana and Sawyer, 2013). The SFC framework represents a closed monetary economy where different sectors interact endogenously through behavioural decision making rules to generate economic activity while also satisfying double entry accounting principles. This implies that the inflow of one sector has to be exactly matched by the outflow of another in a fully tractable monetary system. A key advantage of this framework is that it allows us to assess the impact of policies across all sectors of the economy making it possible to capture all positive and negative feedback effects that might result in counter-intended policy outcomes (Naqvi, 2015).

¹⁸ A working paper (Jackson and Victor, 2014) describes the structure of the SIGMA model and sets out a number of scenarios. A working version of the model, complete with scenarios, can be found online at: www.prosperitas.org.uk/sigma.

Figure 13 summarizes the relationships between the sectors in the model. The production sector is taken as a macro institution that produces both capital and consumption goods where output is determined through demand by household consumption, government expenditure, and firm investment. This demand generation is supported by banks in the form of deposits, loans and advances to form a complete circular flow economy. The production process requires three complimentary inputs: capital, labour, and energy. Capital is generated through investment, worker households provide labour, while energy is supplied by energy producers. This allows the firms and the energy sector to be dual-linked through energy demand and prices. Energy supply is generated from an exogenously determined mix of non-renewable and renewable energy. The real economy is integrated with the environment through two channels. First, energy production requires a non-renewable input that depletes over time and second, GHGs, generated through the production process, accumulate in the atmosphere.

Figure 13 The SFC model framework



Source: own illustration.

The model is calibrated for the EU region and five policy scenarios are evaluated; low consumption de-growth scenario (Jackson, 2009), a capital stock damage function (Stern, 2007; Nordhaus, 2011), higher share of renewable energy (Tahvonen and Salo, 2001), carbon taxes on firms and households (Marron and Toder, 2014), and technological shocks to capital and energy productivity (Herring and Roy, 2007). Policy outcomes are assessed on performance in terms of overall output, unemployment, income and income distributions, energy, and emission levels. Table 4 below summarizes the results of the scenarios.

The results show that neither the link between output and distribution, nor the one with the environment is predetermined. In particular, while the connection between output and unemployment conforms to the standard formulation of Okun's law, the income level and the functional income distribution are not as clear-cut. Similar macro level outcomes can be the result of very different underlying structural and distributional changes. Regarding environmental aspects,

the absolute decoupling of energy use and emissions from output can be observed in this model in some cases.

Table 4 Summary of results

	Growth		Distributions		Environment	
	Output	Unemp.	Incomes	Inequality	Energy	Emissions
LowCons	↓	↑	↓	↓	↓	↓
DmgFunc	↑	↓	↓	↑	↑	↑
HiRenew	-	-	-	-	-	↓
TaxF	-	-	↓	↑	-	-
TaxH	-	-	↓	-	-	-
InnoK	-	-	↑	↓	↓	↓
InnoE	-	-	↑	↓	↓	↓

Source: own illustration.

In particular, four policies show different tradeoffs within the trilemma. The de-growth simulation shows that the lower output leads to higher unemployment while at the same time reducing inequality in the functional income distribution. If emissions feed back into the depreciation of the capital stock as in the damage function experiment, this has the opposite effect: unemployment falls but the functional income distribution worsens for workers. At the same time, this is the only policy which leads to higher emissions due to increased investment requirements. Environmental taxes on firms or households have mainly distributive effects while leaving output and emissions largely unchanged. The driver of this result is the tax transmission onto the households through the price channel. While higher prices reduce real income levels, it also allows firm owners to extract additional profits in the short-run. This increases their income and subsequently demand. As a result, consumption is substituted away from workers towards owners which in the long-run reverts output and emissions to pre-tax levels.

Three policies, however, are triple-win situations. Increasing the share of renewable energy reduces emissions while leaving all other outcome variables virtually unchanged. Finally, innovations in capital or in energy productivity reduce both energy use and emissions, while at the same time raising real incomes and redistributing towards workers.

3.4.4 Testing innovation, employment and distributional impacts of climate policy packages in a macro-evolutionary systems setting

In a fourth and final model, *Rengs et al.* (2015) developed a macro-evolutionary model of an artificial one-country closed economy to study a range of climate policies. The model accounts for a variety of observed behavioural features of consumers, such as imitation, status and snob effects. The model simulates 2000 households, 100 (initial) firms, five commercial banks, one capital goods firm, one central bank and one central government. The model describes improvements in carbon intensity of production due to innovation and diffusion of associated greener products, under the influence of various policies.

A basic policy scenario is examined with a carbon tax which generates revenues (a "carbon fund") that can be used to create and finance various additional instruments of a climate policy package: a shift from labour to carbon taxes, a direct consumer subsidy for greener (less carbon-intensive) products, subsidizing green innovation, and green procurement (governmental spending on greener products). In addition, a policy package is considered consisting of a combination of consumer product subsidies and green procurement, and one comprising all the mentioned policy instruments.

The results show that the scenarios generate similar trends for most variables but with different levels. The simulations show that GDP is quite constant with variations of 1%, meaning a stable economic development under all scenarios. The results for the unemployment rate show a wider bandwidth, namely up to 4%. The best scenario, having the lowest unemployment rate is shifting taxes from labour to carbon tax, while the worst is only implementing a carbon tax. Policy packages with carbon tax revenues used to support environmental innovation, diffusion or both, through subsidies perform in between (see also the contribution of Area 3 in chapter 4). Generally all simulation experiments are characterized by steadily rising unemployment, mainly because of the combination of technological progress and resulting increasing labour productivity with wages increasing slower than productivity. As a consequence the government faces increasing cost of social welfare benefits to unemployed.

As expected, the policy package subsidizing R&D with the revenues from the carbon tax was the best to perform in terms of carbon emissions. The second best policy package is CT or the carbon tax scenario, which simply taxes carbon emissions. Unfortunately, even if it showed a good performance in reducing unemployment, the policy package shifting carbon revenues to labour tax reduction does not perform well in terms of carbon emissions as it increases the average level of consumption in the economy.

3.5 Further policy insights

The Area 2 of the WWFforEurope project also paid specific attention to effective policy design. To this end, *Gazheli et al.* (2013) studied the various stakeholders involved in sustainability transitions and investigated their behavioural biases which may have an influence on the process of policy design, implementation and acceptance. Different sustainability transition policies can be classified as relating to niche, regime and landscape levels, following the MLP framework. In this framework, transition policy is seen as the stimulation and management of learning processes, and creating awareness to keep opportunities and options open to increase the flexibility and adaptation capacity of social and technological systems. It requires a multi-actor and multi-domain approach with explicitly formulated long term policy goals, which implies that one should pay attention to the potential friction between various goals supported by different stakeholders. Policy formulation is not easy and partly subjective or trial-and-error (but unfortunately learning is slow with long term goals). There is no general agreement upon a transition end goal, and neither is there a common social welfare function. Linked to this, it is also problematic that political groups have very different implicit social welfare functions – in terms of performance on economic, environmental and equity issues. And if policy makers and politicians agree on policies to be implemented, still many different

types of policy failures are possible. These can be related to the process of policy design and implementation of policies.

The authors analyze the potential impact of transition policy measures on the various stakeholders (or actors) involved in sustainability transitions. A first stakeholder whose decisions have important consequences for the environment is the consumer. A number of consumer behaviours that involve bounded rationality or other-regarding preferences may be considered in transition policy design. Important biases such as habits, status quo bias, affect and imitation contribute to inertia. Transition strategies need to either reduce or take well into account the effects of these biases. Important cases are altruism, fairness and effects of framing influence levels of cooperation, acceptance of policies and risk perceptions. Norms and rules evolving in groups have important consequences too. Understanding group behaviour and the role of leaders in organizations, role models, and potential change agents can inform about the effectiveness of sustainability transition policy.

A second group of stakeholders consists of producers and investors. Producers are often over-optimistic and their decisions are affected by anchoring. Instead of perfect profit-maximization firms usually stick to satisfactory strategies, convert these into routines, and change only when profits drop below the market average (or profits of competitors). Similarly, investors – who allocate capital and thereby have a very large influence on the speed of transitions – show different behavioural anomalies. Overconfidence in financial markets, for example, may increase risky investments beyond what is rational. This may contribute to the cyclic behaviour of the economy, while it can also help to counterbalance loss aversion in the case of risky sustainability projects (such as on renewable energy).

A third group of stakeholders includes institutions like governments. In the context of sustainability transitions, it is important to keep in mind that governments are made up by groups and individuals that have their own self-interests and behavioural characteristics. They usually operate out of the market, so they do not have the same market incentives as consumers and especially producers to behave rationally to some degree. Furthermore, the policies made by governments have to consider the behavioural features of economic actors. Issues that matter for policy effectiveness are framing that changes risk perceptions, fairness that influences policy acceptance, and status, affect and habits that create inertia.

Another important insight is that policy is not singular but should cover a mixture of complementary instruments to effectively foster a transition. As illustrated in Table 5, a policy mix for a transition to a low-carbon economy needs to deal with two types of challenges, namely a triple externality problem (environment, knowledge/technology and lock-in), and four escape routes (carbon leakages, energy rebound, shifting of environmental problems and green paradox). For this purpose, a combination of environmental regulation and technological support is essential, but in a particular way (with particular instruments, design and timing). Pricing of externalities is needed to avoid serious energy/carbon rebounds. Several other instruments, such as information provision, eco-labelling and technical standards, run the risk of allowing for too much of such rebound. Attention is needed for regulation of commercial marketing of carbon-intensive products and services. The lack of economic rationale of a sustainability transition (logical only from an environmental but not an economic angle) should be addressed, notably recognizing that it is not economically attractive to make a transition to less concentrated or lower EROEI (energy return on

energy investment) technologies like renewable energy sources. Note that past energy transitions brought many economic benefits which is not the perception for the transition to renewable energy (it will create employment, but this just means energy will become more labour-intensive and expensive, at the cost of economic production and profitability in the rest of the economy). Next, the economic crisis poses particular challenges, as private and public support of renewable energy has become less popular.

Table 5 Policy challenges illustrated for a transition to sustainable energy

Challenges		Effective policies and strategies
General	Specific	
(a) Triple externality problem	(a1) Environmental externality (negative), which means that prices do not reflect social (private + external) costs, thus providing incorrect incentives for consumption, production, investment and innovation.	<ul style="list-style-type: none"> Private decisions (firms, households, investors and innovators) account for external costs over the life cycle of products and services (e.g. carbon pricing) Remove environmentally harmful subsidies
	(a2) Innovation/knowledge externality (positive) causing the investor in innovation activity to not always be able to reap a fair share of the innovation benefits. Uncertain and long-run return on investment in innovation is characteristic of many environmentally-relevant innovations.	<ul style="list-style-type: none"> Protect innovators so they reap benefits of investments (e.g. patent law) Subsidize promising but still expensive technologies. Basic research with low return on investment by the state (universities and public research institutes).
	(a3) Lock-in, which means a positive externality for the dominant technology, and a negative externality for new, niche technologies.	Discourage innovation in dirty technology, subsidize set-up costs and infrastructure of cleaner alternatives, restrict advertising of dirty locked-in product, and employ status seeking to sell cleaner alternative (e.g. electric car).
(b) Escape routes: indirect, undesirable and avoidable effects of well-intended policies and strategies	(b1) Carbon leakage due to relocation of polluters to countries with lax environmental regulation and associated changes in trade patterns	International climate agreement
	(b2) Energy or CO ₂ rebound: indirect effects of energy conservation that create new energy use	<ul style="list-style-type: none"> A hard ceiling to total CO₂ emissions. Carbon pricing. Combination means tradable permits are an effective policy.
	(b3) Environmental rebound: shifting of environmental problems	Complete systems analysis of sustainability policies and renewable energy strategies to identify unwanted indirect effects.
	(b4) Green paradox: oil market response to climate/innovation policies.	Externality pricing of fossil fuels (supply policy).
© Lack of economic rationale of a sustainable energy transition	(c1) Transition to less concentrated or lower EROEI (energy return on energy investment) technologies has environmental but lacks economic logic. Therefore it cannot be compared with historical energy transitions.	<ul style="list-style-type: none"> Improve EROEI of technologies by R&D incentives and public investments. Subsidize niche technology. Feed-in-tariffs for renewable electricity.
	(c2) Environmental innovations are generally factor-saving, not output-quality improving. This means that while innovative technology is more expensive it does not provide relevant new features for users. This hampers rapid diffusion.	<ul style="list-style-type: none"> Try to combine function/quality and factor-saving innovations. Make consumers and producers more conscious of environmental impacts (to stimulate voluntary action, altruism). Subsidize niche technology.

Challenges		Effective policies and strategies
General	Specific	
	(d) Financial-economic crises create specific barriers to an energy transition, notably in terms of reduced public support of renewable energy and energy conservation.	<ul style="list-style-type: none"> • Integrate macroeconomic policies with environmental and innovation policies. • Show that energy transition can go along with economic recovery. • Prepare society and politics for a lower rate of economic growth.

Source: slightly adapted from van den Bergh (2013).

Next to environmental regulation and technology policies, financial and investment dimensions need to be addressed with adequate policies. A sustainability transition requires a quite specific investment portfolio which is quantitatively and qualitatively different from the investment portfolio that has characterised the prevailing economic system. Existing investment portfolios are dominated by speculation in asset prices and by the extraction and depletion of natural capital resources. Easy returns in the first category are gained at the cost of unstable asset prices and rising inequality. Easy returns in the second are achieved only at the expense of resource depletion and environmental degradation. As these easy returns begin to dissipate, the dominance of extractive investments leads to portfolios weakened by stranded assets (HSBC, 2012) with potentially destabilising effects on future financial markets.

By contrast, the investment portfolio for a sustainable economy consists in building long-term assets in low carbon technology and infrastructure, in resource-efficient manufacturing, in service provision, in health care, in education, in public spaces and social goods, and in the protection and restoration of habitats, forests, wetlands, soils and other natural capital assets. Some of these asset types may offer very conventional benefits with rates of return comparable to existing portfolios. Others however will impose considerable challenges on existing institutional structures and financial architectures.

Finally, to increase the social and political acceptability of such an ambitious set of transition policies, it is probably wise to temper the preoccupation of politics and society with growth through careful reconsideration, public debate, and information provision, since growth is no panacea for the conflicting problems of our time, and in certain cases rather acts as a barrier to solving these. The reason is that it is likely that under such a policy package, growth will – at least for some time – result to be lower than we are accustomed to (*van den Bergh*, 2015). To accomplish this the insights from *Kettner et al.* (2012, 2014) are relevant for policy as the presented wellbeing indicators and indicator systems go beyond the narrow concepts of national economic accounts. This work forms a basis for more a comprehensive representations of the social and ecological dimension in macro-economic modelling and policy making. This may lead to a better understanding of synergies as well as conflicts between sustainability and economic growth. Moreover, the specific indicators listed have in common that data are available for multiple EU countries, so that implementation of them is feasible at the EU wide level.

Sustainable work strategies

A neglected issue in transition policy studies is work-sharing, to contribute to making full employment compatible with green goals by reducing the need for high growth. *Zwickl et al.* (2016) examine this issue. The empirical literature on work-sharing policies goes back to the 1930s (Crépon and Kramarz, 2002; Hunt and Katz, 1998; Kapteyn et al., 2004; Logeay and Schreiber, 2006; Skuterud, 2007; Taylor, 2011) and discuss the potential of work-sharing to achieve full-employment in an economy with biophysical limits (Bernanke and Powell, 1984; Bernanke, 1986; Bosch and Lehndorff, 2001; Neumann et al., 2013; Whaples, 2001). For more than a century, policy makers and labour unions have been periodically interested in work-sharing as a job generating strategy. In recent years, ecological economists have emphasized the role of work-sharing to achieve full-employment in an economy with un/underemployment on the one hand, and biophysical limits to growth on the other hand (e.g. Antal, 2014; Brenke et al., 2013; Pullinger, 2014; Røpke, 1999; Schor, 2005).

The economic consequences of work-sharing are controversially debated amongst economists. The standard argument put forward by critics is that the hiring of additional workers in response to a work-sharing reform is associated with fixed costs of employment, which will increase costs per unit of output, and can ultimately even reduce employment (Hunt, 1999) if the higher marginal costs of labour due to higher hourly wages will lead to a substitution from labour to capital (Hunt and Katz, 1998). This effect is argued to be even stronger when the work time reduction is accompanied by a wage-compensation (Taylor, 2011). Another frequent argument is that a reduction in legal regular working hours is offset by an increase in over-time work and therefore does not reduce actual hours. Reviewing the empirical literature on work-sharing since the Great Depression provides little evidence for these concerns. The main results from the empirical studies are that (1) in most cases legal reductions in hours worked almost fully translated into actual reductions in hours worked (so the policies were not offset by an increase in over-time work); (2) when wage compensation was promised by governments or labour unions, real hourly wages actually increased; (3) while there may be temporal adverse employment effects for some workers, there exists no credible, robust empirical evidence for negative effects of work-sharing on overall employment; although there is a lot of scepticism on this, some argue the medium to long-run employment effects are positive (Logeay and Schreiber, 2006). Another finding from the literature is that the overall success of the policy strongly depends on the institutional setting and on public support (Berg et al., 2014; Bosch and Lehndorff, 2001; Freeman, 1998; Kapteyn et al., 2004); the latter can be subject to rapid changes.

Antal (2014) examines if full employment is compatible with green goals. Two empirical correlations are studied: one between economic growth and environmental impacts, and the other between the lack of economic growth and unemployment. It is demonstrated that, at a global level, economic growth is strongly correlated with environmental impacts, and barriers to fast decoupling are large and numerous. On the other hand, low or negative growth is highly correlated with increasing unemployment in most market economies, and strategies to change this lead to difficult questions and tradeoffs. The coexistence of these two correlations – which have rarely been studied together in the literature on "green growth", "degrowth" and "a-growth" – justifies ambivalence about growth. To make key environmental goals compatible with full employment, the decoupling of

environmental impacts from economic output has to be accompanied by a reduction of dependence on growth. In particular, strategies to tackle unemployment without the need for growth, such as a systematic reduction of the cost of labour (e.g. through an environmental tax reform), increasing wage flexibility at high income levels, public employment, non-wage employment aimed at self-sufficiency, and reduction of working hours, need much more attention in research and policy.

Wellbeing and Multi Criteria Analysis

The necessity of having economic performance measured in terms of welfare beyond GDP calls for new approaches capable of simultaneously taking into account economic as well as social and environmental indicators. Data envelopment analysis (DEA) proved to be a proper tool for measuring the economic performance and for assessing efficiency of firms and national economies in the situations of multiple inputs and multiple outputs where the indicators are expressed in different units and some of the outputs are undesirable (like pollutants). In their paper Lábj et al. (2014) analyze the economic performance of 30 European countries for the year 2010 in terms of welfare beyond GDP. As the two input indicators for GDP (Y) (measured in PPS), representing the output of production activities, capital stock (K) (measured in PPS) and labour (L) (measured in thousands of persons employed) are taken into account. Moreover, GHG emissions (measured in thousands of tons) and the Gini coefficient representing the income inequality indicator are considered. The DEA model can be extended by adding further economic as well as social and environmental indicators. Using EUROSTAT data of the year 2010 the relative social welfare efficiency can be estimated. The results of the DEA model yield the set of social eco-efficient countries: Switzerland, Belgium, Norway, Denmark, Germany, United Kingdom, Sweden, Finland, Slovenia and France with the efficiency score equal one (for a complete list see Table 2 in Lábj et al., 2014). None of the inputs or outputs (as defined above) of these countries could have been improved without worsening at least one of the other inputs or outputs. The remaining countries in the sample are inefficient because they could improve their performance by increasing GDP and/or decreasing Gini coefficient, GHG emissions or the inputs labour and capital stock. For example, Austria should actually increase GDP and its Gini coefficient by 3%, Spain by 6.5%, Bulgaria by 12% in order to achieve the level of social eco-efficient countries (for more details see Lábj et al., 2014).

Deeper insights into strengths and weaknesses of particular economies and into potentials for improving the efficiency can be obtained by looking at the multipliers (or the weights) for the inputs and outputs. For illustration, the results of six countries are reported in Table 6: Germany as a country with a very strong economy, Greece, a country with weak economic performance, then Finland, Sweden and Austria, countries with high standard of living and Slovakia as a country with rapid economic development.

The results in Table 6 show very strong economic performance of Germany (the strongest economy in the EU) compared to other countries in the sample with the weighted data 1 for GDP and zero for the inequality indicator. On the other hand, the main contribution to the efficiency score for Slovakia is provided by the inequality indicator, where the position of the country is much better compared to other countries in the sample – in contrast to the lagging technical efficiency of Slovakia. Similar results can be found for Austria. The weakness of Greece in technical efficiency is not surprising. The results for Sweden and Finland show more balanced contributions of both output

factors, confirming the reality that the welfare in these countries is based on all indicators: economic, environmental as well as social. In Sweden, both indicators contributed to the evaluation approximately in the same degree, while in Finland the social dimension played a more important part. The resulting weights for particular economic, social and environmental indicators indicate the human judgments and priorities of economic policy that appear to be crucial for the social welfare. In other words, they provide the implicit weights for the social welfare function (estimated for every country by the DEA model) and are closely related to implicit weights of social welfare components discussed in Table 2 of *van den Bergh* (2015: 4). By introducing these weights, the impact of different strategies and goals of economic policy for social welfare can be estimated. To identify sources and drivers of the social welfare change over time, an inter-temporal analysis may be undertaken. This is a task for future research.

Table 6 Scores and output weights obtained with Model 4, for selected European economies

Country	Score	Output weights	
		<i>GDP</i>	<i>Inequality</i>
Germany	1	1	0
Finland	1	0.240	0.760
Sweden	1	0.535	0.465
Slovakia	0.972	0	1
Austria	0.969	0.009	0.991
Greece	0.880	0.009	0.991

Note: numbers in the columns for "Outputs" can be interpreted as welfare weights of GDP and Inequality, describing the strengths of the particular countries relative to the other countries.

Source: own illustration.

3.6 Conclusions

Rich countries will likely face a falling share in world growth, for an extended period of time, due to a catching-up process by poor and medium-income countries. Whether economic growth and reduction of energy and material inputs can be combined is the important but still open question. While relative decoupling is occurring in many countries for many environmental substances, required absolute decoupling is much more difficult, notably for GHG emissions, and will only be possible under very strict internationally consistent environmental regulations. It therefore would be wiser to focus on solving unemployment directly instead of assuming that growth is needed or sufficient to do this. Aiming for growth should be accepted as representing a risky strategy from an environmental perspective, which does not mean that growth will (always) be impossible or undesirable. The core challenge, however, is solving simultaneously unemployment and unsustainability (and inequity). This is not an easy goal either, but it means a clear aim for searching effective. The more optimistic answer might be: According to the projections and scenarios reviewed, it seems that Europe would fare best by adjusting to low economic growth. This could be realized by giving less priority for and attention to growth (a-growth). It would allow for changing the

balance of objectives regarding environment, equity and other public goals versus average income (the focus of growth aims).

We presented here a range of theoretical, empirical and modelling studies performed in Area 2 of the WWWforEurope project that addressed the relationship between growth, employment, equity, and environmental performance, notably climate change. This included four different model approaches, in terms of behavioural assumptions (rationality versus bounded rationality, representative versus populations of heterogeneous agents), inclusion of financial and labour markets, international trade and carbon leakage issues, etc. All the models indicate that the challenges are huge and important policy changes are needed. Whereas the WIFO model emphasizes more the 'traditional' economic mechanisms like prices and different sources of technical change, the other models emphasize the role of behavioural change, stock-flow relationships, as well as the links between monetary and physical variables.

In particular, to respond to the challenge of moving quickly to a low-carbon economy, a policy mix is needed, consisting of environmental regulation and technological support. Pricing of externalities is needed to avoid serious energy and carbon rebound. Non-pricing instruments like eco-labels or technological standards on an incomplete set of products run the risk of allowing for too much rebound. Attention is needed for regulation of marketing of carbon-intensive products and services. Public support of promising but still expensive technologies is still needed for some time as the sustainability transition will otherwise only have environmental and lack economic logic. The preoccupation of politics and society with growth should be tempered with careful information provision as growth is no panacea for the conflicting problems of our time, and in certain cases rather acts as a barrier to solving these.

Policies need to take into account the specific bounded rationality and social interaction that characterizes stakeholders, such as the role of: intrinsic next to extrinsic motivations, status and image in consumer purchased of environmentally relevant goods and services, different types of norms in creating opportunities for environmentally beneficial behaviours to spread through social groups, framing in communication of information (e.g. about climate change), and the impact of commercial advertising.

Policies need to take into account the specific bounded rationality and social interaction that characterizes stakeholders. Altruism and reputational concerns stemming from intrinsic motivations can be discouraged by extrinsic motivations like rewards or punishments. The dilemma here is, however, that without extrinsic motivation we cannot expect any significant change in the pollutive behaviour of consumers and producers alike. Next, it is important to account in policy for the behavioural feature that consumers are often much more concerned about status and image than about environmental performance of purchased goods and services. This suggests that status feelings have to be redirected to environmentally well performing alternatives.

Next, creating opportunities for environmentally beneficial behaviours to spread through social groups is important to facilitate transitions. In the case of energy saving, for example, norms can sometimes be more powerful than information provision. The difference between descriptive norms (dominant behaviours) and injunctive norms (approved or disapproved behaviours in a particular society) is relevant here: if the aim is to change behaviour, focusing on injunctive norms is

the appropriate strategy; if the goal is to prevent negative behaviour, both injunctive and descriptive norms can be used in persuasive messages. Last but not least, the role of framing in communicating information (e.g. about climate change), and in the provision of products (messages of commercial marketing) deserve more attention. Differently framed messages can trigger different behavioural reactions.

Finally, the relevance of gender is clear, such as difference in risk perception between men and women which is relevant for environmental decision-making (consumers and producers), and the need for mixed composition of research teams on environmental innovation. This deserves more attention in future research.

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KEY INFO

- Area 3 looks at ways to stimulate the rate of innovation and industrial activity with the aim of making economic dynamics simultaneously compatible with the environment as well as social inclusiveness and employment in particular.
- General policies for shifting innovative and industrial activity towards environmental issues (e.g. carbon pricing, R&D subsidies and regulation) as well as specific policies that shall enable a new growth path are proposed (e.g. fostering the emergence of 'green gazelles').
- Moreover, the role of entrepreneurial dynamics, and the quality of academic research on the dynamics of change are examined.
- Based on the insights of the research, Area 3 defined a strategy for implementing a new industrial policy for Europe which can serve as a strategic framework for pursuing the policies described above and which is capable of shifting tradeoffs into potential synergies.

4. CHAPTER AREA 3: DRIVERS OF CHANGE – INNOVATION AND INDUSTRIAL POLICIES

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4.1 Introduction: Europe's challenges on innovation and industrial performance

The emergence of new technologies create many new opportunities for firms to enhance their competitiveness; but they also change existing production modes and consumption patterns, posing therefore also a threat. Technological change is occurring at a time of a multitude of challenges that firms and society in Europe must address: globalization has shifted economic power to Asia with its low-cost competitors; an ageing population in Europe is shifting consumption and work patterns and will increasingly weigh upon welfare systems in Europe in the next decades; most importantly, limited natural resources and the increase in greenhouse gas emissions and pollution are calling for immediate ecological and climate changes.

Though it would have been tempting under these circumstances to opt for a "low road strategy" to stimulate growth, for instance by increasing working hours, limiting social inclusion and postponing climate change goals, European countries agreed upon a much more ambitious new growth path. Europe's 2020 Strategy defined the achievement of smart, sustainable and inclusive growth as its main goal. In a nutshell, the strategy aims at achieving a socio-ecological transition by fostering economic growth but also social development (e.g. with respect to employment, gender or cultural aspects) while actively taking ecological and resource constraints and opportunities simultaneously into account.

Critically, research and innovation are generally seen as a major driver of growth. The term 'innovation' should be understood here in a broad sense, however. It can be a technological innovation, but also an organizational, marketing or social innovation. An important aspect is also whether innovations improve resource efficiency and/or allow energy savings. Innovation can be

pushed by technological progress but can also follow current and future market forces, for instance an increasing demand that stems from the envisaged shift towards more inclusiveness and sustainability. In order to shift Europe towards a new growth path with greater social inclusiveness and more ecological sustainability, it is important that the innovation system itself as well as innovation and industrial policy promote this change in paradigm at the EU and national level. That is, governmental interventions should work not only in favour of increased economic dynamism, but also simultaneously in favour of future mission-oriented goals and systemic change. The literature has discussed these effects of innovation under the term the rate and direction of inventive activity, with the rate of inventive activity supposed to spur economic dynamism and the direction potentially affecting issues such as environmental sustainability and social inclusiveness (e.g. Lerner and Stern, 2012); the rate of inventive activity *within green technologies* can however be very important for environmental sustainability, and shifting the direction of inventive activity towards green technologies is sometimes seen under an economic double dividend reflecting increased "green" growth opportunities. Clearly, the challenge today is to simultaneously influence both the rate and the direction of inventive activity, or the rate of invention in a certain direction (Foray and Phelps, 2011).

Both the EU's Lisbon Strategy, set in motion in 2000, with the goal of making the EU the "most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion" as well as its successor strategy, Europe 2020, have attempted to simultaneously spur economic dynamism, environmental sustainability as well as social inclusion, requiring innovation and industrial policies which can in principle affect the rate and direction of inventive activity. The evidence so far on progress on these fronts is mixed at best, however.

The EU continues to be lagging behind the US in terms of innovation performance. On the input side, the EU's R&D goals in the Lisbon and Europe 2020 strategies have been set against the background of higher US R&D intensity (2.8% of GDP in 2012, compared with 2% of GDP in the EU28); further frequently discussed EU-US gaps are in university rankings and venture capital financing of start ups. At the level of outcomes or industrial performance, the main EU deficit versus the US consist of the lack of so-called "Yollies", or young leading innovators in knowledge-intensive sectors which grow to be large, R&D intensive firms (Cincera and Veugelers, 2014; Veugelers and Cincera, 2010). There are few firms in the EU which can be compared with the likes of Apple, Google, Facebook, Tesla, etc.¹⁹

In terms of directing inventive activity towards environmental problems, while the EU holds the highest share of patents in green technologies, the "private green innovation machine" is far from moving at full speed, with not only the US consistently showing up in headlines with news such as the development of a prototype nuclear fusion reactor by Lockheed or Apple's plans to produce an electric car on its own. Moreover, China is rapidly increasing its efforts in fighting climate change, with significant increases in scientific knowledge production relevant for green technologies recently

¹⁹ Another key indicator of the transatlantic gap is in terms of productivity performance. For a recent summary of the literature in this area, see Ortega-Argilés et al. (2015). They find that across manufacturing, services and high-tech manufacturing sectors US firms are more able to translate their R&D investments into productivity increases.

(*Veugelers*, 2015). On the social inclusion front, here narrowly defined as employment, research from Area 3 (*Vogel et al.*, 2015) has shown that technological progress in the EU over the past 20 years was labour-saving and energy-using, the opposite of what we ideally want in terms of simultaneously reaching climate, economic and social goals.

Area 3 of the WWWforEurope project hence looks at ways to both stimulate the rate of inventive activity, boosting innovation and industrial performance, but at the same time making this boosted performance compatible with environmental sustainability and social inclusiveness. It redefines competitiveness understood as the ability of countries to achieve an ecologically sustainable and socially inclusive growth path. This implies analysing the drivers of growth, specifically innovation and research, and policy fields which impact on growth drivers, namely innovation policy and industrial policy, while at the same time – simultaneously – investigating ways to shift Europe from the current growth path to a new one with greater social inclusiveness and more ecological awareness. *The aim of this chapter is to summarize and explore how innovation and industry and their different key actors can contribute to the aspired socio-ecological transition, and how innovation and industrial policies can push that process along.*

4.2 Main findings of Area 3 in the perspective of developing a new growth and development strategy

Area 3 has pursued two overarching research questions in relation to developing a new growth and development strategy, namely the **feasibility** of such a new growth path, simultaneously addressing goals of economic dynamism, environmental sustainability and social inclusion, as well as (the feasibility of) **policies** which enable the transition to such a new growth path. These research questions were broken down into **five key questions**.

- a. What is the impact of green innovation on growth, employment and social cohesion?
- b. How do we realign innovation and industrial performance towards social and ecological objectives?
- c. How can entrepreneurial dynamics drive smart and sustainable growth?
- d. How can intangible assets and the quality of academic research act as drivers of change?
- e. How can we redefine competitiveness so as to encompass social and ecological objectives and to motivate a new industrial policy needed for technology shifts and inclusive, sustainable growth?

The first question (section 4.2.1) addresses more specifically the issue whether green innovation can go hand in hand with growth and social cohesion in principle (feasibility); the following questions then look at what to do in order to make it possible to reach the targets simultaneously, starting from a general framework for shifting policies in section 4.2.2 to more field-specific policies in sections 4.2.3 and 4.2.4. The last question (section 4.2.5) deals with a strategy to foster the implementation of these policies, defined as a new industrial policy.

4.2.1 What is the impact of Green Innovation on Growth, Employment and Social Cohesion?

A first theme to the work of Area 3 is the impact of green innovation on growth, employment and social cohesion, which determines whether simultaneously reaching goals of economic dynamism, environmental sustainability and social cohesion can be feasible at all. A key contribution on this theme comes in exploring the social and environmental implications of innovation and technological change in terms of employment effects. Area 3 has mixed results in this respect. *Vogel et al.* (2015) explore to what extent technological change has engendered labour and/or energy saving. They find that technological change has produced substantial job losses especially for low and medium-skilled workers, where modest energy saving has been registered. However, also ICT and advanced manufacturing technologies have been found to produce job losses in medium to high skilled labour. This means that highly skilled labour is not insulated from substitution effects induced by digital technologies.

Linked to the work by *Vogel et al.* (2015) noted above, *Licht and Peters* (2013) define the scope of ecological innovations and their employment effects by exploiting data from the Community Innovation Surveys for different EU member states. This is critical, as various channels exist through which different kinds of innovation may destroy existing jobs (displacement effects) or may create new jobs (compensation effects). In general, the majority of empirical studies find an employment-stimulating effect of product innovation whereas the effect of process innovation is ambiguous ranging from significantly negative to positive. Overall, results show that the general productivity trend had a strong negative impact on employment growth. More surprisingly, specific process innovations both with and without environmental-friendly characteristics only have a minor impact beyond the general productivity trend. The general growth in output (e.g. linked to the business cycle) had the biggest impact on employment growth. Their work notes that *environmental process innovations, such as those caused by country-specific environmental regulation policies, in all countries have little or no impact on employment beyond the general country-specific productivity trends*. Thus, *Licht and Peters* (2013) do not point towards the often feared negative employment consequences of environmental policies affecting production processes. In addition, they found that *product innovations were a significant driver of employment growth in all countries and that this is also related to environmental-friendly product innovations*. In fact, in manufacturing in some countries (e.g. Germany, Slovakia, and Czech Republic) the employment impact of new products with environmental-friendly characteristics even outperforms the employment impact of new products without environmental-friendly characteristics. In addition, *Licht and Peters* (2013, 2014) also contribute by showing that *ecologically-friendly industrial policies which shift the innovation focus towards environmental-friendly innovation will probably not destroy jobs but contribute to job creation at least in some member states*. Industrial policy might therefore be used in addition to, or in combination with, horizontal policies to stimulate eco-innovation and new eco-friendly production processes without severely endangering employment.

Overall, *Licht and Peters* (2013) critically show that environmental innovation (e.g. induced by industrial policies to reduce environmental impact of production and consumption) might not create

tradeoffs with regard to the competitiveness of firms in terms of their ability to generate jobs.²⁰ Especially for countries close to the productivity frontier, employment growth increasingly might depend on the ability of firms to develop and introduce new eco-friendly products. Hence, there might be room for a growth path which combines both employment growth and lower environmental burden. In the next sections, we will look at policies which may enable such a growth path.

4.2.2 How do we realign policy towards Social and Ecological Objectives?

A second key question in Area 3 is how policies can be designed in such a way as to achieve both social and ecological objectives.

Concerning the feasibility of policies to shift the focus of firms' efforts towards environmental issues, there is empirical evidence that government intervention can contribute to starting the 'private green innovation machine', as surveyed by *Veugelers* (2014A).²¹ Technological progress responds to government policy, and also to private-sector initiatives such as voluntary agreements. Ecological objectives can be achieved by an effective strategy that includes three key elements:

Firstly, a higher price on carbon. Indeed, for the EU – and probably worldwide – the biggest hindrance for more effective shifting of firms efforts are higher carbon prices which even in the EU are too low to incentivise behavioural changes, therefore the development of an efficient carbon market or of an energy tax is essential for low-carbon investments.

Secondly, R&D support is crucial to address the knowledge externality associated with the creation of new clean knowledge. Public R&D support is especially crucial for clean technologies which are still in the early stages of research and development, helping to neutralize the installed base advantage of the older, dirtier technologies; however, the share of environmental R&D support within Horizon 2020 has remained at 9%, unchanged from previous framework programmes (*Veugelers*, 2014A), while "dirty" technologies such as fossil fuels continue to receive subsidies. And as green R&D is now global, so some level of international coordination would be beneficial to pool resources, avoid excessive duplication and accelerate diffusion. So far, there is very little international coordination on these issues on behalf of the EU (*Veugelers*, 2014A).

Thirdly, government regulation, when properly designed, can both create demand for clean products and stimulate the creation of clean knowledge. Lower cost clean processes can be an important, if not more important lever for the development and adoption of green innovations by the private sector – which might follow. Government regulation can, among others foster the growth of "green gazelles" (*Colombelli et al.*, 2015) and innovation in general; but it needs to be stringent, as shown by *Ghisetti and Quatraro* (2015), and *Arfaoui et al.* (2015), using the example of the EU's chemical regulation initiative REACH: there, a too large time window before the regulation finally becomes binding has induced firms to adopt a "wait and see" attitude, with the initiative

²⁰ It should be noted that in case of skill-biased technical change (if there is a skill-bias of eco-innovations), technological upgrading would have negative distributional effects (what is not in line with social inclusion).

²¹ In line with the 'Porter hypothesis' (Porter and van der Linde, 1995).

having so far no palpable impact on innovation performance (even though this was its stated goal). Higher stringency would have led to faster technological transition.

This leads to a more general point that in order for these three key elements to work, great attention has to be paid to detail:

First, an overarching important point is that an effective strategy needs to include a combination of tools rather than relying on individual instruments; indeed *Veugelers* (2014A) and *Crespi et al.* (2015) present the compelling argument that it is desirable for green policies to comprise a portfolio of instruments that simultaneously includes carbon prices, R&D subsidies and regulation.²² The complementarity between policies is shown by Aghion et al. (2009), who find that the carbon price would have to be about 15 times larger during the first 5 years, while subsidies would have to be on average 115% higher in the first 10 years, to achieve the same effect of climate mitigation. Especially in times of budget consolidation, this is a crucial argument for an efficient and effective public policy.

This need for a combination of innovation and technology-specific policy instruments so as to stimulate ecological innovation is also emphasised by *Crespi et al.* (2015), who see an optimal mix covering the entire innovation life-cycle as "smart regulation". Drawing on a taxonomy of environmental policies, they argue that environmental regulation and innovation policy are in fact complementary, since the first is designed to reduce negative, environmental externalities, while the second addresses positive externalities, mainly knowledge-related externalities, deriving from a problem in the appropriability of the benefits of innovation investments. Not combining environmental and innovation policies can lead to unintended and undesirable outcomes such as the "green paradox" or a technological lock-in, with a well-known example being the subsidization of renewables without a sufficiently high carbon tax, hence leading to overall lower energy prices and a rebound in the use of "dirty" energy.

Second, such green policies need to be long-term and time consistent in order to enable public policy to leverage the private sector to engage in long-term green innovation investments – this is specifically relevant for green innovations where bigger infrastructure investments are required. The predictability of green policies is crucial for the private sector – to change behaviour; firms must know that changed policies are here to stay.

Third, supporting a higher carbon price through R&D subsidies may also be necessary because an energy tax could reduce overall innovation activity or R&D expenditures, indicating a conflict between innovation and environmental policy, as found in previous modelling exercises.²³ *Baccianti and Löschel* (2014) however look at innovation activities and innovation policy instruments using a multi-sectoral, multi-country CGE model, for the first time modelling both process and product

²² The implication is that formerly very different policy strands (on industrial policy, innovation policy, and regional policy) should be integrated into one supply side strategy driven by societal goals; this could and should lead also to a common policy approach across several DGs in Brussels, see also section 4.2.5.

²³ There are two channels why this may happen. First, higher energy prices could negatively affect energy-intensive sectors in terms of their sales, leading to reduced R&D. Second, investment in new green technologies might crowd out investment in other technologies and the aggregate impact on economic growth would be negative, if the non-pollution related technologies were more productive

innovation separately. They first find that an energy tax is negative for process innovation, but positive for product innovation expenditure, supporting the feasibility of policies aimed at enabling the transition to a new growth path. Then they simulate the effect of several policies on welfare, finding that innovation pays off over time: policy simulations show that a constant 20% product innovation subsidy (technology push-policy) increases aggregate consumption as a measure of welfare by around 6% (2% with a process innovation subsidy), while a subsidy on the investment in physical capital ("demand pull policy") has a negative impact on economic growth even in the long run, but only by a small amount (around 1%). The energy tax has the classic effect to reduce aggregate consumption. A 25% energy tax brings about a 3% loss in aggregate consumption in the long run. Hence, from their results, an energy tax should be combined with subsidies to product innovation as the most favourable combination, leading to positive economic and environmental dynamics in the long run. Stimulating product innovation is in principle also more favourable for employment prospects as evidenced above by *Licht and Peters* (2013), however *Baccianti and Löschel* (2014) do not model explicitly the effects on employment.

Fourth, *Reinstaller and Reschenhofer* (2015) argue that the direction of technical change is conditioned by firms' accumulated capabilities and knowledge bases. Innovation, especially in the short run, tends to be much more incremental than radical as firms' search for new ideas and efforts to master new technologies usually happens in close proximity to what firms already know. Hence, R&D subsidies and price signals as discussed above on their own are not sufficient in themselves to shift productive systems to new ecologically sustainable trajectories: Technological complementarities and cumulated capabilities crucially affect the direction of technical change and innovation, or put differently, firms usually diversify into new technological areas based on their existing capabilities. "Smart diversification" policies hence should aim both at making sure that policies aimed at redirecting innovative activity taking into account existing capabilities, and at the diversification of these capabilities through R&D and adoption of new technologies. The direction of inventive activity towards new *targets will take time as a consequence, which makes implementing ambitious policies as soon as possible all the more urgent, over a credible long-term time horizon.* More precisely, *Reinstaller and Reschenhofer* (2015) make three recommendations relevant for directing innovative activities:

- *Mission-oriented policies* must strike a balance between trying to foster technological capabilities which are very far from the capabilities the targeted firms currently master, and between avoiding technological lock-in by focusing too narrowly on a small set of ideas. Hence, the goals of mission-oriented programmes should be defined broadly. Mission-oriented programmes may also benefit from complementary market making measures, e.g. through public procurement. This is also very relevant for the efficiency of policies, as mission-oriented programmes can easily ask for too much, requiring long-term efforts with uncertain outcomes.
- *Smart diversification policies* – namely policies aimed at directing firms' innovative activities towards new directions – should support entrepreneurship and entrepreneurial discovery as this fosters recombining competencies across technological fields and sectors. Here, knowledge transfer mechanisms are of great importance: e.g. labour mobility (of researchers, e.g., between industries, or between industry and academia), R&D cooperation schemes (such as COMET in Austria), fostering employee start-ups and FDI (if well embedded in the local innovation system).

- *Project selection criteria in R&D subsidy programmes* could be adapted so as to penalize R&D projects by firms which incrementally expand the existing knowledge base (and are hence not very risky) and to favour R&D projects which aim at diversifying existing capabilities (and are more uncertain as a result).

Smart diversification policy links to work by *De Propriis and Corradini* (2013) who examine the presence and determinants of technological platforms, defined as "knowledge and scientific launching pads that spin out of key enabling technologies", across EU Countries, and explore the mechanisms through which these influence inter-sectoral technology spillovers. They model the systemic nature of technology platforms using patent and patent citation data from the European Patent Office (EPO). In particular, they provide empirical evidence that the presence of key enabling technologies at the base of the platform may lead to a more sustained interaction across second tier innovations characterised by a "distant" knowledge base. Drivers of innovation are formulated on three levels. Firstly, *De Propriis and Corradini* (2013) confirm what has been found in previous studies; that is, the higher level of originality and generality of patents developed by universities and governmental not-for-profit organisations. More interestingly, they show that the crucial role they play in terms of technological synthesis and radical innovation lies in their higher propensity to effectively adopt and use enabling technologies within their innovation activity. For this reason, the paper suggests that *publicly funded research may play a key role in driving radical innovation, acting as a boundary-spanner in connecting, translating and integrating different technological knowledge*. Secondly, they have been able to derive those technologies that can be intrinsically defined as 'enabling technologies'. These technologies are able to generate a spawning of patents spreading across different technological fields and for this reason they act as enabling technology with the potentials to enhance the innovative capacity of other sectors. Finally, the paper singles out patents related to green technologies, providing a map of the EU regions and technological sectors strongly related to them. Hence, they offer empirical evidence that *technological platforms may enhance the integration of green technologies within innovations across related and unrelated technological classes*.

On shifting firm activities towards social objectives, Area 3 has far fewer results. Work by *Reinstaller* (2013) highlights the difficulties associated with operationalising the social innovation concept for actively fostering it through policies. Looking at employment as a major determinant of social inclusion, however, *Vogel et al.* (2015) suggest lowering the employers' social security contributions in exchange for an energy tax, which should favour energy-saving technical progress over labour-saving technical progress. More precisely, the rate of energy-saving technological change can be spurred by raising energy taxes, while the rate of technological change in labour-saving fields could be dampened by reducing the compensation of low-skilled workers, thus making them more attractive to hire. This could be achieved in a way that maintains their wage income by lowering the social security contributions paid for them by employers. *Aiginger et al.* (2013) look at countries which manage to perform well in all three dimensions of the new growth path, i.e. the Scandinavian countries. They also score highly on a variety of input indicators, including those concerning an "enabling" social system (on active labour market policy, social expenditures for the

disabled and other disadvantaged groups). Scandinavian social policy could therefore serve as something of a model of how to achieve social inclusion while minimising negative incentive risks.²⁴ A key finding for the project overall is that higher social and environmental sustainability can go hand in hand with higher economic performance, pointing to the feasibility of a new growth path.

The next sections examine more specific policy fields which can contribute to the transition to a new growth path.

4.2.3 How can entrepreneurial dynamics drive smart and sustainable growth?

As mentioned above, entrepreneurial dynamics are a key problem in the EU, potentially slowing down the creation of new industries and the diversification of existing knowledge bases and, as a result, the efforts to shift innovative efforts towards activities compatible with a new growth path. Area 3 contributes to the already-extensive literature on entrepreneurial dynamics by focusing on the role of entrepreneurship in green technologies and in social endeavours.²⁵ First, the role of small and young firms for competitive green technologies and regions are analysed, and the best framework conditions for this development are identified. Two contributions are made here. Firstly, *Colombelli et al.* (2015), based on a multi-country study spanning 400,000 firms, investigate the impact of eco-innovation on firms' growth processes, with a special focus on "gazelles" or high-growth firms (HGFs). Their results show that on average firms producing eco-innovations are characterized by higher growth rates than those generating generic innovations. Moreover when they focus on HGFs, they find that green gazelles, i.e. gazelles generating environmental innovations, actually grow faster than the other gazelles. One reason this happens is because of environmental regulations having an impact on downstream firms' demand for green technologies, leading to sales growth at the suppliers of such green technologies: the effects of environmental policies pushing firms to adopt green technologies engender a bandwagon effect in the economy, which spreads along the value chain. At the same time, technology policies promoting the development of specific technological areas should be coordinated with environmental policies in such a way that firms producing new technologies are given the necessary incentives to produce 'green technologies' to anticipate the increasing demand from downstream firms, possibly inter alia through public procurement.

Secondly, *Aschhoff et al.* (2013) examine the potential contribution of SMEs (small and medium enterprises) and young firms to inventive activity in particular in energy and renewable sources, using patent data with a special focus on Germany. Their results suggest that young and small firms might not be able to drive technology development towards a more sophisticated use of energy resources and renewable energies. According to them, in Germany, the direction of technical change in green technologies is determined by established large firms. In addition, they do not observe a shift of private sector's production of inventive activities towards technologies which aim at the production, storage, distribution, and management of new energy technologies compared to

²⁴ These would arguably manifest themselves in low employment rates, low productivity, and eventually high public debt ratios.

²⁵ On entrepreneurship, the different likelihood of survival and growth of firms, and the need to couple entrepreneurship and innovation, see Vivarelli (2015).

other fields of technology. *Given the societal need for new energy technologies the paper argues in favor of government regulation and incentives to stimulate research, development, and implementation of new energy technologies. However, they do not find arguments that such stimuli should necessarily favor SMEs or young firms* (bearing in mind the limited scope of their analysis, with data ending in 2007 and a special focus on Germany only; an analysis of the US, for example, may have yielded different results).

Area 3 also looked at aspects of social innovation and social entrepreneurship outlining what social innovation can do in principle; however, in terms of policy, it remains unclear how to foster social innovation and entrepreneurship and here further work is needed. *Social innovation and social entrepreneurship* can enable businesses to be innovative by marring the exploration of new markets with new forms of business organisation. *Reinstaller* (2013) in part defines social innovation as a social process leading to institutional change that can have a significant impact on the wellbeing of specific social groups or society at large. He introduced the idea of entrepreneurial change agents who are driven by the desire to trigger institutional change that lead to improvements in the conditions of others. He argues that the failure of companies to generate innovations and to be competitive can be seen as an institutional and organisational and not so much a market failure. On this, social innovation can play four roles in overcoming such failures. The first role can be conceived as the inside-out function of social innovation: as innovation is a social and organisational process organisational mechanisms that support experimentation, the development of new interpretations of reality (i.e. new mental models and belief systems) and their integration into the organisational set up are crucial to escape organisational myopia. The second role may be conceived as an outside-in function of social innovation. Strategic choices about resource allocation are based on beliefs about how markets and competitors and relevant institutions work, and what consumers need. Often these beliefs turn out to be wrong, as the management is not aware of significant changes in consumer preferences or other relevant institutional factors. The monitoring and close interaction and exchange of companies with change agents can break this type of institutional myopia. Another role for social innovation is that companies turn themselves into change agents in order to change institutional framework conditions that are unfavourable for their activities. Recent attempts to bypass traditional banking finance and engage into crowd funding schemes are an example of the third role social innovation can play in overcoming institutional failures in the context of industrial innovation. The final role is that specific types of social entrepreneurship involve the creation of new businesses and hence the development of new markets.

4.2.4 How can intangible assets and the quality of academic research drive change?

This subsection investigates two specific issues potentially key for enabling a new growth path. First, investment in intangible assets is seen as an important element of the new path of economic growth, not least because intangible investment is immaterial and hence has no or little energy or resource costs, while potentially less affected by diminishing returns, as "ideas" do not get depleted by using them. Competitive advantage in advanced countries is more and more determined by innovation, which in turn benefits from investment in intangible assets. The OECD has defined intangible assets – what it calls "knowledge-based capital" in a recent report (OECD, 2013) as referring to computerized information (software and databases); innovative property (patents,

copyrights, designs, trademarks); and economic competencies (including brand equity, firm-specific human capital, networks of people and institutions, and organisational know-how that increases enterprise efficiency). While intangible investment is overall poorly measured, available figures suggest the EU significantly lagging behind the US. It is estimated that between 1995 and 2007 approximately 34% of labour productivity growth in the United States was due to intangible investments (EU14: 19.9%; from OECD, 2013); the share of intangible investment in GDP is much higher in the US (approx 11%) than in selected EU countries (2% in Greece, to 10% in the UK).²⁶ The problem is not only the sub-investment in intangibles but the scarce effectiveness of such investment in Europe. In other words, differences in levels are important, but differences in elasticities as well (Ortega-Argilés et al., 2015).

Falk (2013) analyses the determinants of greenfield investment in intangible assets in emerging and industrialized countries. Such intangible assets (i.e. software, R&D, organizational capital) are seen as non-monetary assets without physical substance and with low energy consumption and low carbon emission. He argues that *higher investments in knowledge intensive activities, such as intangible assets, are essential for making progress in the implementation of Europe's 2020 strategy*. He finds that *improving the quality and quantity of skilled labour, decreasing firm entry regulation costs (in particular in Southern European countries), further investment in broadband infrastructure and better investment protection systems are the main factors in driving investment in intangible assets*. In this regard, the empirical results on the determinants of international investment in intangible assets may help to develop a proactive action plan to increase the attractiveness of the EU countries for future international investments in intangible assets.

Such a policy framework to support intangibles is considered by *Ebner and Bocek* (2015) who argue that in this context innovation and technology policy measures should focus not only on R&D, but more importantly on strategies towards patents and intellectual property rights. This implies also a clearer playing field for industry-university collaborations. Policy should therefore facilitate innovative activities and its impact on the wider economy. Here, industrial policy requires cooperation between public and private sector institutions; the latter more easily occurs in a context of geographical proximity such as in clusters. *Cluster policies should marry research institutions' specific research focus with the regional knowledge base in order to generate spillovers*.

Secondly, turning to the role and importance of academic research and teaching, in economies where knowledge is the most important production factor – or one which allows for creating competitive advantage – knowledge-creating and -transmitting institutions such as universities and public research organizations play an ever increasing role. At the same time, societal challenges such as climate change and resource scarcity demand inter alia substantial scientific and technological progress, again driven by efforts in basic and applied research. Against this background, governments have aimed at increasing the potential contribution of universities to economic growth and tackling societal challenges, both elements of a new growth path which combines economic dynamism with respect of environmental boundaries.

²⁶ Two recent big EU funded research projects were COINVEST and INNODRIVE.

On this potential contribution of universities to innovation based growth, *Veugelers* (2014B) suggests that policy should take a long-term perspective for developing an industry-science ecosystem, and avoid short term 'quick-fixes' that fail to enhance the systemic nature of industry-university collaborations. A particularly dangerous policy practice she argues is a target focusing only on the commercialization of university technologies through academic patenting and spin-offs, ignoring the broader contribution to economic development with other pathways, most notably the research based training and mobility of human capital from universities: university graduates are probably the most important contribution of universities towards a new growth path, rather than commercialisation of university discoveries. In this regard, policy makers should be more "innovative" in their search for effective policy interventions, venturing beyond the classic spin-off and incubator programs.

Janger (2015) argues that previously, policies to improve the economic and societal impact of universities at the European level were partly guided by a so-called "European Paradox" diagnostic (European Commission, 1995), in that European science believed to be excellent was perceived not to be used properly by firms and entrepreneurs in Europe, and hence not transformed into value added. As a result, the main thrust of efforts to increase the commercial and societal use of academic knowledge consisted in strengthening the so-called third mission of universities, i.e. the commercialization of university-developed inventions through, e.g. technology licensing and academic spin-offs.

However, empirical data such as bibliometric evidence point to the fact that European science is actually not excellent, at least when compared with the US (e.g. Albarrán et al., 2010; Dosi et al., 2006); various university rankings, including the purely bibliometric Leiden Ranking, make the same point. The diagnostic of a European paradox, but also theories of the role of universities for innovative activities have led to a policy focus on improving the linkages of universities with firms, either through engagement or commercialisation activities, while the role of university quality – or research and teaching quality – for the impact on the economy and society has not received the same attention. In particular the Triple Helix concept (e.g. Etzkowitz and Leydesdorff, 2000) often takes US universities as examples for the entrepreneurial role of universities in innovative activities, which have large budgets and excellent teaching and research faculty, managing to attract the best research students from all over the world. Also the national innovation systems literature leads to a focus on cooperation and the linkages of universities with business, without stressing the conditions for the effectiveness of such linkages. *Janger* (2015) argues that this picture misses an important part of the story. Any university entrepreneurship can only be as strong as its quality of research and teaching. A narrow focus on linking universities with firms and society without making sure that universities' first two missions work well is an ineffective approach towards increasing the contribution of universities to innovative activity, and hence to a new growth path.

Indeed *Janger* (2015) surveys evidence suggesting that high quality academic research increasingly matters for firm innovation in Europe and also for solving societal challenges: i) firm innovative activity is more and more science-based, with science guiding firms' search for new ideas (Fleming and Sorenson, 2004), ii) high quality peers attract the best students and researchers from all over the world, which provides for a stream of highly qualified graduates working not only in academia but also in firm R&D labs, enabling the fast growth of young innovative firms; iii) moreover, high quality academic research has been shown to be conducive to spin-offs, in particular the presence of star scientists and firm entry are linked, and iv) there is a link between firm location

and university research quality: firms locate their R&D headquarters/labs close to high quality universities; investigations of technology transfer activity confirm more intense business science links for high research quality universities.

Without universities which are able to operate at the frontier – in terms of research excellence – and on a level par with the US, it is difficult to imagine a sustainable European growth and competitiveness model. Shifting R&D and innovative activity to new aims such as climate change can only be promising when the underlying quality of research efforts is as good as it can be, reducing the cost of shifting and increasing the return on R&D efforts. Florida and Cohen (1999: 609) put it best in arguing that the key role of universities behind the different impacts of quality on growth and society, is the *attraction of talent*: "If nations and regions are really serious about building the capability to survive and prosper in the knowledge economy and in the era of talent, they will have to do much more than simply enhance the ability of the university to transfer and commercialise technology. They will have to act ... in ways that make places more attractive to and conducive to talent."

The question naturally arises what to do in Europe to make universities more attractive for talented researchers and students? To examine the brain drain of top researchers to the US, *Janger and Janger and Nowotny* (2013) look at the factors which make academic jobs attractive based on a stated choice experiment among 10.000 researchers worldwide. They find that it is not just money (as in salaries and research funding) as well as the quality of peers (or the prestige of universities) matters for job choice in academia, but even more importantly the perspectives for a tenured position at universities as well as early research independence, both being more easily offered within universities' working units organised as departments, rather than chairs.

Insofar as talented researchers attract talented researchers, turning a situation of asymmetric into one of symmetric mobility (or a brain drain into brain circulation) faces the challenge of considerable inertia and persistence – *Janger and Nowotny* (2013) find that researchers are "willing to pay" (in terms of foregoing salary) approx. US\$17,000 p.a. for working with top researchers. However, as stated, high quality peers are not the only job attractor. European universities can offer attractive career perspectives and working environments, while the career model of US universities in the form of the tenure track has come under a lot of strain recently, in addition to problems of funding. Researchers would be willing to pay approx US\$23,000 for the prospect of a tenured position, based on a positive research performance evaluation ("tenure track system").

Janger et al. (2013) establish an index of attractiveness of academic research jobs for the US and 10 selected EU countries. Unsurprisingly, the US seems to be most able to offer attractive jobs, followed by a group of four well performing European countries: the Netherlands, Sweden, the UK and Switzerland, with other EU countries such as France, Italy or Spain far behind. Basically, the US offers a triplet of advantages which are difficult to emulate in the short term: attractive salaries, attractive working conditions (the prospect of tenure and early research independence) and high quality peers. Change will need time and certainly not less attractive working conditions than in the US, accentuating the need for urgent reforms to career and organizational structures, complementing the findings on the competition between autonomous universities as a determinant of university research performance (Aghion et al., 2007, 2008, 2010). While this literature could be interpreted as "getting the best out of the researchers a university has got", the findings of *Janger et al.* (2013) are more oriented towards "getting the best in the first place".

4.2.5 A strategy for implementation: How can we redefine competitiveness so as to encompass social and ecological objectives, framing a new industrial policy needed for technology shifts and inclusive, sustainable growth?

After this overarching look at policies necessary for shifting firm activities to a new growth path, the question naturally arises as to how implementing such policies should be fostered from a strategic standpoint. Area 3 defines a new industrial policy, which could serve as a strategic framework for pursuing the policies described above. The policies described above will naturally affect government, industry and other actors of the innovation system, such as universities. Focusing on a broader set of goals is likely to contribute to reaching compromises, rather than being held up by conflicts over individual policies.

The recent literature on industrial policy has suggested that any new industrial policy must be different from the past. It should promote competition and enable a discovery process in a cooperative climate between government and business (Rodrik, 2008; Bailey and De Propris, 2014, Bailey et al., 2015). Also, it should align industrial policy with the long-term interests of society.²⁷ Various strands of work in Area 3 converge in suggesting that industrial policy has to be systemic and driven by a wider vision, instead of a stand-alone policy in conflict with other facets of government policy, in order to simultaneously target economic, environmental and social goals.

A new industrial policy requires four 'game changing' dimensions (*Aiginger*, 2015):

Game Changer 1: From GDP to Beyond-GDP

Economists have always understood that GDP is not a welfare indicator, yet GDP and its growth nevertheless dominate the discussion of economic policy and are seen as the single overarching measure of success of an economy or region. The criticism of this indicator and its alternatives was summarized by the Stiglitz–Sen–Fitoussi Commission, leading to the 'beyond-GDP goals'. The OECD has also published a corresponding set of 'Better Life Indicators', which many countries have started to use as a measure of performance. Income per capita and income growth will remain important goals particularly for low-income individuals, regions, and countries. Other goals receive greater priority, as the marginal utility of income declines. This does not preclude GDP dynamics from remaining an instrument for reaching other ultimate goals, such as full employment, social security, health, consumer choice, and so on – the key point is that we should measure the achievement of the ultimate goals, not of the instruments used to reach them.

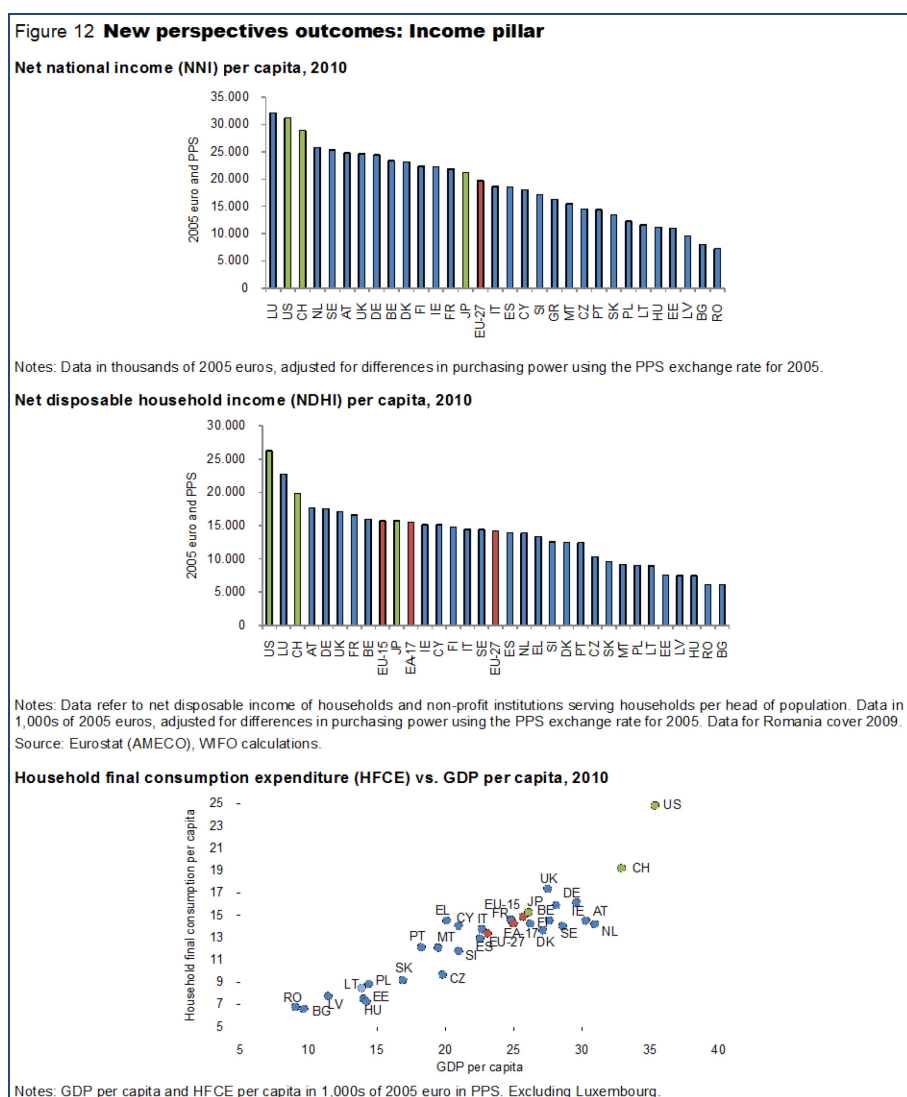
For a new European growth path and industrial policy, this change from GDP to beyond-GDP is particularly important. For example, the industrial sector is one of the largest production sectors and is responsible for the lion's share of research and development. If the innovations developed in manufacturing do not help attaining welfare (as defined by the beyond-GDP goals), the potential of the economic system is not fully utilized. Industrial policy should enforce and accelerate manufacturing's welfare orientation, support also non-technical innovation, and be systemic and forward-looking (*Aiginger*, 2014, 2015).

²⁷ *Grabas and Nützenadel* (2013) suggest that the green orientation of industrial policy in the new member states of Europe is in its initial phase. Conditional upon the availability of adequate financing, the years up to may see a widespread trend of green job creation in several central and East European countries, notably the ones with more environment-conscious political elites (the Baltic republics, Slovenia, the Czech Republic, potentially Slovakia and Hungary).

Game Changer 2: Redefining Competitiveness

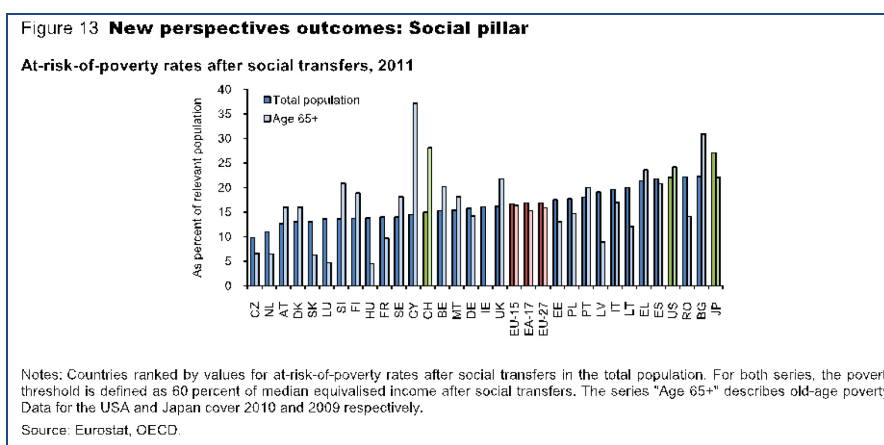
The term 'competitiveness' has been used predominantly in the narrow sense of cost competitiveness, calling for lower wages and other production costs as policy instruments to 'stay' competitive or 'regain' competitiveness. In its enlightened version, productivity is acknowledged as a second element of cost competitiveness, leading to unit cost approaches. The cost focus has been criticized for a long time, spawning approaches that emphasize technological or qualitative competitiveness, and measuring 'outcome competitiveness' by using a combination of targets (e.g. income, employment). Finally, competitiveness should be based on capabilities like skills, innovation, institutions, an empowering social system, and ecological ambitions. Outcomes should be defined by the achievement of broad, socio-economic goals.

Figure 14 **New perspectives outcomes: Income pillar**



Source: *Aiginger et al.* (2013).

Figure 15 New perspectives outcomes: Social pillar



Source: *Aiginger et al.* (2013).

Aiginger et al. (2013) therefore propose defining competitiveness as the 'ability to deliver beyond-GDP goals'. They compare European countries according to their new measure of competitiveness. The authors apply this competitiveness definition to assess the post-crisis competitiveness of European countries using both individual indicators and a composite indicator on outcome competitiveness under new perspectives which is based on three pillars, namely income, social and ecological pillars.

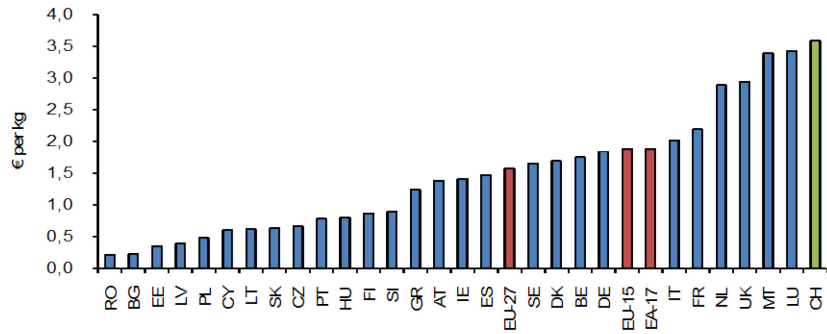
The income pillar shows that there is a clear and enduring north-south divide across EU member states. Besides, US, China and Japan have greater NNI rates (net national income) than the EU27 average and NDHI (net disposable household income) greater than EU17 average. In relation to the social pillar, the Netherlands come first, followed by the Scandinavian countries and Austria. Some new member countries also score highly, such as the Czech Republic, which has the lowest risk of poverty in the total population of all EU27 countries. Slovenia and Hungary are also in the top 10 due to low poverty risk and income inequality. Germany and France do only average overall. However, Spain and Greece come last with the highest youth unemployment rates and high poverty rates. Other weak performers are Italy (large employment gender gap and the second-smallest impact of social transfers), Latvia (highest poverty risk) and Bulgaria (second-highest old-age poverty risk). On average, the Southern European countries (Greece, Spain, Portugal and Italy) lag behind the new member countries from Central and Eastern Europe on the social indicators considered here.

The indicators for the ecological pillar again show an uneven picture across member states: Sweden is the best performing one across all indicators, thanks to the country's sustained policy efforts towards sustainability. CO₂ intensity is low in countries using nuclear power (France, Sweden), hydropower (Austria) or solar and wind energy (Spain and Portugal). The share of electricity generated from renewable sources is highest in Austria, Sweden, and Portugal.

Figure 16 New perspectives outcomes: Ecological pillar

Figure 14 **New perspectives outcomes: Ecological pillar**

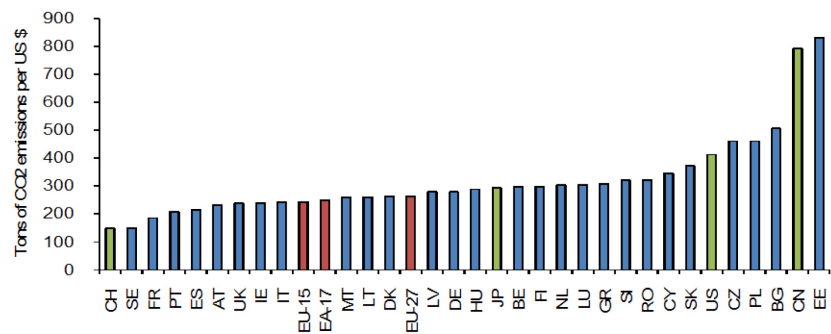
Resource productivity, 2010



Notes: GDP per kg of domestic material consumption; euro in current prices.

Source: Eurostat.

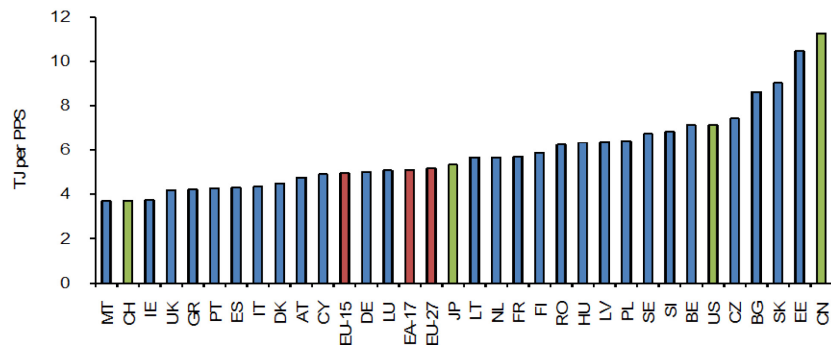
CO2 intensity, 2010



Notes: Tons of CO2 emissions from fuel combustion relative to GDP at PPS.

Source: IEA, Energy Balances.

Energy intensity, 2010



Notes: Terajoule of total primary energy supply relative to GDP at PPS.

Source: IEA, Energy Balances.

Source: *Aiginger et al.* (2013).

Resource productivity is high in small countries (Luxemburg and Malta) and in large countries with a small manufacturing base (UK, France and Italy), but low in the new member counties (the Czech Republic, Poland and Estonia).

The new Outcome Competitiveness provides therefore not only the vision of a goal to aim to, but more crucially it suggests the three coordinates of the trajectory to engage to achieve it: these are the three pillars. This definition could end the preoccupation of economic policy with costs instead of capabilities (*Aiginger, 2015*), and instead advocate for Europe to aim to be a more prosperous, sustainable and equitable Europe.

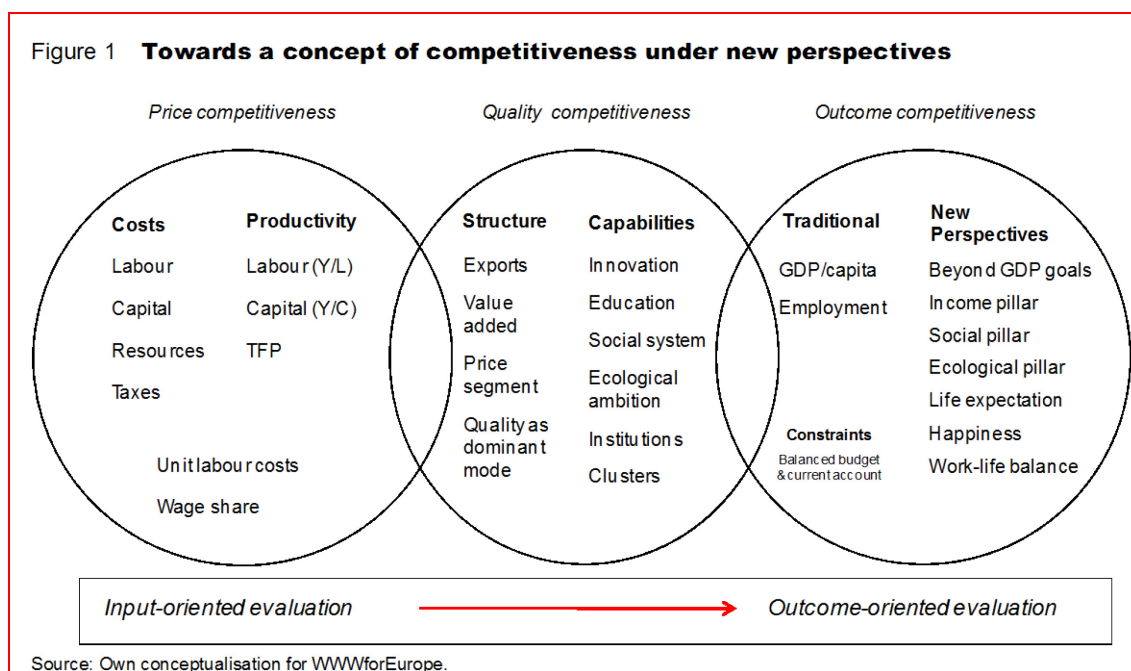
Indeed the new definition of Outcome Competitiveness links inputs and processes to outcomes that are broad enough to encompass 'beyond-GDP targets': in particular, they also include ecological and social outcomes.

The new definition of Outcome Competitiveness is based on capabilities like skills, innovation, institutions, an empowering social system, and ecological ambitions and it is measured with outcomes that include ecological-socio-economic indicators as captured by the three pillars.

The high-road to growth marks a transition from seeking a competitiveness reliant on lower costs (low wages, low taxes, low oil prices), to one driven by higher productivity - boosted by dynamic capabilities such as education, innovation, renewable energy and social inclusion. It is economically difficult and socially undesirable for high cost economies such as those in Europe to seek to increase per capita GDP by undercutting wages, because this would still be a competitive advantage of low-income countries. Advanced and high cost economies must rather endeavour to raise quality, innovation, and develop new services (*Aiginger, 2015*). This definition could end the preoccupation of economic policy with costs instead of capabilities (*Aiginger, 2015*). The current austerity discourse and preoccupations with the size of governments must not distract from this fundamental priority and the fundamental role that policy must play in projecting a vision and setting a trajectory for growth and prosperity for all.



Figure 17 Towards a concept of competitiveness under new perspectives



Source: *Aiginger et al.* (2013).

Game Changer 3: Distinguishing between a Low Road and a High Road

In principle, countries have two ways to close current account deficits, to increase dynamics of the economy, or to reduce unemployment. One is to lower costs (wages, taxes, energy prices); the other is to raise productivity, by boosting capabilities (education, innovation), and by becoming a leader in energy efficiency and renewable energy. We label the first path to regain competitiveness a 'low-road strategy' and the second a 'high-road strategy'. It is difficult for countries with high wages to increase per capita GDP by reducing wages, because low-income countries have greater competitive advantages in this aspect. Industrialized countries can more successfully compete on quality, innovation, and new services (*Aiginger*, 2015).

Game Changer 4: Industrial Policy as a Strategy for High-Road Competitiveness

Academic literature and commentary provide many definitions of industrial policy, without an agreement on a common definition. *Aiginger* (2015) proposes to define industrial policy as economic policy to promote the competitiveness of a country or region, where competitiveness is defined as the ability to deliver the beyond-GDP goals. For industrialized countries with high per capita incomes, industrial policy should therefore explicitly be a high-road strategy of competitiveness based on capabilities, good institutions, and high ambitions for social and ecological behaviour. For Europe and its vision of a socio-economic system with a strong emphasis on inclusion and sustainability, this high-road strategy explicitly includes equality and green goals.

This definition of industrial policy should at least help mitigate the current conflict between industrial policy favouring on the one hand specific sectors, and on the other hand activities with

positive external effects like innovation and education. It should also mitigate the conflict between industrial policy calling for low energy prices and environmental policy aimed at significantly reducing carbon emissions. Society's ultimate goals determine the direction in which it should move, and the weighting of these goals will differ according to income levels, preferences, and cultural attitudes. These ultimate goals should set the direction of policy interventions and the instruments of industrial policy.

Policy documents developed by the EU Commission, international organisations, and a number of national governments are starting to accept the need to defined new goals for industrial policy where the latter term is enjoying a renewed interest and enthusiasm (*Aiginger, 2014*). All proposals directly or indirectly focus on the fundamental changes in the structure of the economy as a whole, not only on a narrowly defined manufacturing sector, since the borders between manufacturing and services are ever more blurred. The European Commission puts sustainability 'at the core' of industrial policy (unfortunately, jointly with a rather conventionally defined competitiveness); however, Europe's fear of losing cost competitiveness relative to the US is reducing its determination to press ahead with the implementation of ground-breaking changes that would cut across most sectors. EU's commitment to pursue an ecologically and socially centred industrial policy is still in progress. Its Energy Roadmap 2050 sets the goal to reduce greenhouse gas emissions by as much as '80 to 95%'. Radical innovation projects, such as the ultra-low carbon steel, are already ongoing. On the positive side, the share of renewable energy has increased strongly, with some countries producing 50 per cent of electric energy from 'green' sources. But new energy sources need complementary fossil fuels and investment in the power-grid infrastructure. Coal use in Europe increased after the collapse of the European emissions trading scheme. Increasing US coal exports made coal cheaper in Europe than gas. At the same time, China is undertaking a deep transformation, trying to increase resource and energy efficiency – albeit from a very low initial level. It has set goals to increase R&D investment to 2% of GDP (the current EU share) and is making advances in electric vehicles and alternative energies.

Europe has in principle two choices to cope with high energy prices: to go for lower energy prices itself (by exploiting shale gas or by reducing taxes on energy) or to further its lead in energy efficiency plus to increase investment in innovation and top education. Given a vision of a system encompassing social and ecological goals, the only viable choice is to pursue an industrial policy to encourage energy efficiency and social and ecological innovation. Industrial policy should foster the long-run transition, not decelerate structural change. This is a demanding challenge, given vested interests and the traditional role of governments to preserve the status quo and national champions.

Refocusing on the economy's industrial base is a necessity to anchor long term socio-economic prosperity, particularly after the experience of bubbles in financial and real estate markets. A new industrial policy should support the transition of traditional, narrowly defined manufacturing to a sector producing greater consumer value, supporting the economy's long-term goals. We therefore define an industrial policy for high-wage countries as strategy to promote high-road competitiveness where competitiveness is defined as the ability of an economy to provide 'beyond-GDP goals'.

An example of an industrial policy aiming at a new growth path is cluster policy. *Ketels and Protsiv* (2013) build empirical data at the regional/cluster level. Their work suggests that the

presence of clusters makes it more likely that companies and regions compete in ways that support the broader objectives of the New Growth Path (and not just GDP per capita). In addition, the profiling of cluster initiatives in Europe indicates that many of them already engage in activities consistent with the New Growth Path. They provide an action platform that can be used for activities that require joint action in a set of related organizations and firms rather than change in the regulatory framework of the economy or individual organizations. Overall, the authors find evidence consistent with *clusters playing a role in making 'High Road'-strategies more likely to emerge*. They also find evidence that European regions differ in their strategies towards these goals, with some being able to pursue all dimensions in parallel.

In developing this, *Ketels* (2015) highlights a number of policy recommendations. Firstly, competitiveness policies need to be translated into industrial policies that reflect the importance of achieving ultimately 'beyond-GDP' goals, enabling Europe to leap on to a socially inclusive, economically dynamic and ecologically committed growth path. This means a national level commitment to clarify policy language to ensure understanding and convergence of efforts around the same targets and goals. Policy should also integrate more effectively economic, social, and environmental policies to achieve beyond-GDP goals. At the same time, evidence has shown that location-specific efforts – in the forms of clusters and cluster initiatives – are more likely to drive high-road growth. In essence, this suggests that cluster performance and economic prosperity are related; however the economic performance of clusters seems to be unrelated to environmental sustainability and social inclusion. From a policy point of view, this leads to two sets of implications: 1) on environmental sustainability, policy should consider identifying a market demand for firms, set clear regulations and steer cluster policy to focus cluster efforts in organizing value chains from existing players, inform companies about rules and opportunities, and coordinate collective research on ecological concerns shared across the cluster; 2) on social inclusion, cluster policy cannot directly act to achieve soft welfare impact.

Overall, what this tells us is that competitiveness and cluster policies should be framed within a broader 'new industrial policy' – or strategy – that is systemic and holistic in considering a range of policies, including innovation policies. A key point is that the implementation of such a strategy needs to be more strictly tied to engaging and delivering competitiveness in the sense of 'beyond-GDP' goals.²⁸

4.3 Conclusions: From Tradeoffs to Synergies?

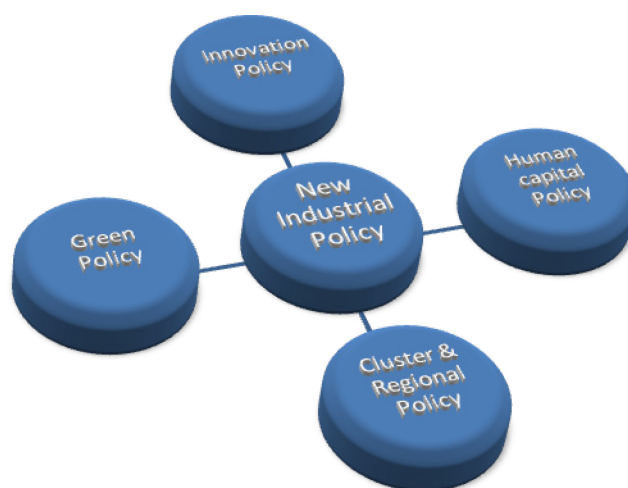
An Area 3 meeting to discuss papers and results found a shared understanding that simultaneously addressing all three dimensions of a new growth path, including economic dynamics, environmental sustainability and social cohesion – at least in terms of employment creation – is indeed feasible.²⁹

²⁸ See also *Amison and Bailey* (2014) who examine the emergence of 'phoenix industries' and point to the possibilities of building smart specialisation strategies and industrial policies driving innovations which are aligned with high-road strategies.

²⁹ *Aiginger* (2014, 2015) recognises that it is naïve to deny a potential tradeoff between an ambitious green policy and economic dynamics under a short run economic perspective (maximizing profits and GDP growth). He notes that any market intervention (specifically those beyond internalizing external costs) switches input prices, narrows down choices and shifts production away from "optimum". However, he argues that the tradeoff is somewhat lower if we (i) switch from output maximization to the

Innovation and industrial policies can shift inventive activity and redirected or green (and social) innovation can be positive for economic dynamics and employment, pointing to synergies rather than tradeoffs. However, attention needs to be paid to details and efforts must clearly be intensified, in particular as regards a carbon price, but also with respect to other areas where the EU shows significant gaps with the US, e.g. as in academic research and entrepreneurship. These increased efforts could be combined under the umbrella of a new industrial policy and should start now, as any delay makes reaching the goals simultaneously all the more difficult, e.g. as early decommissioning of new investments not in line with the requirements of a new growth path would be very costly.³⁰

Figure 18 **New Industrial Policy**



Source: own illustration.

More precisely, bringing together some of the key points from Area 3, we see an opportunity for developing a New Industrial Policy for Europe (NIPE) that is capable of shifting tradeoffs into potential synergies. The NIPE should be delivered by means of a portfolio of instruments that simultaneously steer demand and supply sides to move in the same direction creating an additive effect as against a cancelling-out effect. Such a portfolio needs to avoid tradeoffs between

perspective of welfare (as combination of goals), if we define welfare as a set of functionalities (needs like nutrition, housing, mobility), or if (ii) innovation is "directed" to reducing energy and resource use (instead of increasing labour productivity) ex ante.

³⁰ Meeting participants included inter alia Karl Aiginger, Jürgen Janger, Andreas Reinstaller (WIFO), Lisa De Propris (Birmingham University), Reinhilde Veugelers (KU Leuven), Jordi Jaumandreu (Boston University), Jackie Krafft (CNS Gredeg Nice), Bettina Peters (ZEW) and Christian Ketels (Harvard Business School and Stockholm School of Economics).

technological change and growth/employment priorities. Policy changes need to provide long-run and consistent signals, which provide certainty for businesses in making long term investments and short term adjustment. Technological upgrading instruments need to be mission-oriented programmes, compatible with existing capabilities but enabling capabilities to be diversified. Universities, investment in intangible assets, new technologies and key enabling technologies, and entrepreneurship will be crucial to secure Europe on a growth path compatible with a beyond GDP competitive agenda.

The New Industrial Policy (NIP) for Europe can be articulated in the following key recommendations that can be implemented more specifically by means of initiatives and actions that are likely to marry with EU regional policy. These can be summarised as follows:

1. Industrial policies, green policies, regional policies, cluster policies, innovation policies, education policies and social policies need to be aligned as a strategy for real change. Ecology and social inclusiveness should be seen as cross cutting themes embedded in all other policies. The NIPE should be a complex of systemic solutions that transform the tradeoffs between the three pillars into possible synergies by converting shocks and pressures into opportunities and choices. Long term, transparent and integrated policies are preferred to short-term quick fixes and silos of policies in order to simultaneously target economic, environmental and social goals. To avoid tradeoffs between technological change and growth/employment, policy should compensate green policy related costs for manufacturing by making innovation and training cheaper and more efficient; for example so as to engineer job survival for low and medium-skilled workers and some success in energy saving, cut social security contributions for low skilled workers compensated by an energy tax that would induce energy saving strategies.³¹
2. The NIPE should translate narrow competitiveness policies focused on costs into industrial policies that aim to promote the competitiveness of EU member states and regions, where competitiveness is defined as the ability to deliver the beyond-GDP goals in line with the new definition of Outcome Competitiveness. A high road to growth should be embraced: one that focuses on rising productivity, boosting capabilities (education, innovation), and shows global stewardship in energy efficiency and renewable energy. For industrialized countries with high per capita incomes, industrial policy should therefore explicitly be a high-road strategy of competitiveness based on capabilities, appropriate institutions, and high ambitions for social and ecological behaviour. For Europe's vision of a socio-economic system with a strong emphasis on inclusion and sustainability, this high-road strategy explicitly includes equity and green goals.³²
3. The NIPE must shift the innovation focus towards environmental-friendly innovations that will create new functions and thereby new jobs. In combination with horizontal policies to stimulate

³¹ See *Vogel et al.* (2015) on "biasing" technology progress.

³² See also *Veugelers* (2015) on a policy strategy for 'innovation capacity' catching up. She argues that this requires a systemic, long-term consistent, dynamic policy mix that takes into account countries' initial strength and weaknesses and supports the potential of the country for innovation based development by providing the framework conditions, promoting the access to (foreign) technologies, supporting the building of absorptive as well as creative and by supporting the linking among innovation agents. This requires a high level of development of the quality of the institutions involved in the design and implementation of the innovation policy.

eco-innovation and new eco-friendly production processes, the NIPE can create business and job opportunities.

4. The NIPE needs to provide long-run and consistent signals, which provide certainty for businesses in making long term investments in green innovations and short term adjustment. Effective green policies hence need to be long-term and time consistent in order to enable the public sector to stimulate the private sector to engage in long-term green innovation investments – this is specifically relevant for green innovations where bigger infrastructure investments are required. The predictability of green policies is crucial for the private sector – to change behaviour, firms must know that changed policies are here to stay
5. The NIPE should rely on a portfolio of green instruments that simultaneously comprises higher carbon prices, R&D subsidies and regulation. A combination of green technology policy instruments that support innovations in green technologies and an environmental policy that creates a demand for eco-friendly technology together enables the achievement of higher economic performance at the firm level and greater ecological impact at the systemic level. Failure to acknowledge the complementarity between policies will lead to inefficient policies. Currently, the biggest issue is low carbon pricing.
6. In regulation, stringency matters. 'Soft' approaches with long time horizons lead to 'wait and see' approaches by firms, slowing down technological transition. The NIPE needs to make credible and stringent policy signals now through carbon prices and regulation, while helping firms to adapt through R&D policy.
7. Promote R&D subsidies for product innovation – these are more effective than process innovation and demand-pull incentives.
8. The NIPE should be implemented through mission-oriented programmes that target existing capabilities (overstretching can lead to very inefficient policies) as well as diversifying capabilities (shifting innovative activity). This is facilitated by researcher mobility, R&D cooperation, entrepreneurship and FDI connected to the local innovation system, as well as by R&D project funding selection criteria favouring a diversification of the knowledge base, rather than further specialisation within the existing firms' knowledge base.
9. The NIPE should support entrepreneurial dynamism and social entrepreneurship. Fast growing, young innovative firms are a major deficit of the EU, potentially slowing down a transition to a new growth path. R&D policy and regulation as well as market making mechanisms such as public procurement can foster the emergence of "green gazelles", high-growth firms active in green technologies. Social entrepreneurship is potentially promising, but it remains unclear how to foster it effectively.
10. Investment in capabilities is crucial to ensure that green innovation is shadowed by skills upgrading: this includes investment in intangible assets. Policies to foster greenfield investment include the quality and quantity of skilled labour, decreasing firm entry regulation costs (in particular in Southern European countries), further investment in broadband infrastructure and better investment protection systems.
11. To increase the contribution of universities and academic research/teaching to a new growth path, a narrow focus on commercialisation of academic research results is misguided. Key

drivers of the potential contribution of universities are their research and teaching quality, as evidenced by the top ranking US universities. Europe should put more focus on making EU universities as attractive for the best researchers and students from all over the world as US universities, to foster research and teaching quality. Key ingredients are not only both increased and more competitively allocated research funding, but a proper tenure-track system which provides attractive career perspectives and early research independence to young researchers, which currently lure them to US universities.

12. Green policies should be mission-oriented. Mission-oriented programmes may also benefit from complementary market making measures, e.g. through public procurement.
13. Effective green policies should include a combination of tools rather than relying on individual instruments. These require a portfolio of instruments that simultaneously includes carbon prices, R&D subsidies and regulation. Firstly, the price on carbon should be raised. Secondly, R&D support is crucial to address the knowledge externality associated with the creation of new clean knowledge. Thirdly, government regulation, when properly designed, can both create demand for clean products and stimulate the creation of clean knowledge. Lower cost clean processes can be an important, if not more important lever for the development and adoption of green innovations by the private sector – which might follow. Government regulation can, among others foster the growth of "green gazelles" and innovation in general; but it needs to be stringent. Furthermore, not combining environmental and innovation policies can lead to unintended and undesirable outcomes such as the 'green paradox' or a technological lock-in, with a well-known example being the subsidization of renewables without a sufficiently high carbon tax, hence leading to overall lower energy prices and a rebound in the use of 'dirty' energy. As noted, on R&D subsidies, an energy tax should be combined with subsidies to product innovation as the most favourable combination, leading to positive economic and environmental dynamics in the long run
14. The NIPE should not be space-blind. Cluster policy should be reconciled with innovation and green policies: on environmental sustainability, policy should consider identifying a market demand for firms, set clear regulations and steer cluster policy to focus cluster efforts in organizing value chains from existing players, inform companies about rules and opportunities, and coordinate collective research on ecological concerns shared across the cluster (*Ketels, 2015*).
15. Industrial upgrading should be realised through technology cross-fertilisation at the regional level. Smart diversification policies – namely policies aimed at directing firms' innovative activities towards new directions – should support entrepreneurship and entrepreneurial discovery as this fosters recombining competencies across technological fields and sectors – this would also apply for phoenix industries. Here, knowledge transfer mechanisms are of great importance: e.g. labour mobility (of researchers, e.g., between industries, or between industry and academia), R&D cooperation schemes (such as COMET in Austria), fostering employee start-ups and FDI (if well embedded in the local innovation system).
16. It should support and encourage bottom-up and local initiatives looking for new models of business clustering to foster high-road growth. Firm clusters and cluster initiatives are crucial for

regional resilience: they can achieve greater innovation and adoption, as well as technology cross-fertilisation thanks to related and unrelated varieties (smart specialisation and smart diversification). 'Place-based' competitiveness is more likely to combine social inclusion with economic prosperity whilst leveraging the opportunities of more distributed alternative energies – clusters can be tools for achieving high-road strategies.

Area 3 has of course made only a few contributions to a very complex issue, enriching the existing literature on specific points. Important areas of research not addressed in detail in this report include e.g. the importance of technological adoption, the role of resistance to change, the resistance of incumbents to a change in policies and how to overcome this. E.g. one result indicated that small firms could not shift the direction of innovative activity, this being mainly the work of large firms. If this was true, then this issue of resistance of incumbents against change would be particularly problematic for the transition to a new growth path. Discussing the rate of innovation, it is also important not to foster it at all cost, as innovation for the sake of innovation – e.g. forced early obsolescence of electronic products – can have negative impacts on environmental sustainability. Researchers and policy makers should therefore consider defining and achieving an optimum rather than a maximum rate of innovation.

Overall, Area 3 however represents the view that the transition to a new growth path is feasible, but needs concerted action starting as soon as possible.

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KEY INFO

- Area 4 focuses on European policies and governance in the context of a more sustainable growth path and the requirements of a socio-ecological transition.
- After an in-depth analysis of the crisis of the European Monetary Union, the rescue measures and governance structures introduced in response to the crisis (e.g. fiscal and macroeconomic surveillance, Banking Union) are described.
- Area 4 deals intensively with current European Economic Governance (e.g. European Semester, Europe 2020 Strategy). After identifying some crucial limitations of this governance, a two-step approach is proposed: in the short run, it is important to act within the legal framework of existing treaties; in the medium-to-long run, further steps need to be taken to implement more fundamental reforms.
- Examples are presented of how EU coordination can be improved within the boundaries of existing treaties, for instance by rebalancing the European Semester.

5. CHAPTER AREA 4: GOVERNANCE STRUCTURES AND INSTITUTIONS AT THE EUROPEAN LEVEL

Harald Badinger (WU), Renaud Thillaye (policy network)

5.1 Introduction

Currently the European Union is an area with large disparities, structural differences in labour, product and financial markets, incomplete integration (e.g. of labour markets) and an asymmetric (monetary-fiscal) policy framework. This leads to deficiencies, which do not only limit economic and social development in Europe, but also seriously threaten the cohesion between member states and thus the participation of substantial parts of the population in the benefits of the EU project. EU policies and governance have struggled to prevent disparities from growing and to make convergence happen, both between and within member states. Furthermore, the large heterogeneities across member states make the European policy framework less effective and may become an obstacle for further enlargement and the EU's neighborhood policy.

These disparities and weaknesses are particularly worrying for member states participating to the euro area, or expected to join in the future. As the financial and debt crisis have evidenced, preventing imbalances is key to the future sustainability of the common currency. A minimum level of economic and social convergence is necessary, especially if the EU pursues the ambition of a new, socio-ecological growth model rather than a model based on labour and product market flexibility only.

The EU's ambition for a socio-ecological transition is best expressed by the Europe 2020 strategy, which sets far-reaching economic, social and ecological goals to be achieved in the long run. However, the strategy's implementation has been overshadowed by the European financial and economic crises over the last five years. Existing governance structures and institutions have exhibited a number of substantial shortcomings and have triggered governance reforms, especially

for euro area current and tentative members. Those reforms are not necessarily focused on achieving convergence along the Europe 2020 strategy goals.

This chapter focuses on European policies and governance in the context of a more sustainable growth path and the requirements of a socio-ecological transition. Its research objectives are

- to make an assessment of post-crisis economic governance in the EU and the impact of the crisis' legacy;
- to identify the main inherent deficiencies in the EU and the related bottlenecks on the way to the new growth path;
- to analyse the link between these deficiencies and governance and policies at the European level;
- to spell out changes in the European governance framework which would be necessary for the transition to the new growth path.

Accordingly, this area chapter will be structured as follows. The first part analyses the roots and management of the EMU crisis. It discusses the reforms that have been undertaken since then and further proposals put forward in the literature as a way to deal with the legacy of the crisis. The second part takes a broader perspective on EU economic governance against the background of the Europe 2020 strategy. It provides a more forward-looking analysis of and recommendations for improving European economic governance in the light of a more sustainable, socio-ecological growth model. This discussion is, firstly, built around proposals for enhanced governance in the field of social policy. Secondly, it is supplemented by an analysis of general guidelines that should be considered in future governance reforms. Thirdly, an analysis of questions related to the legitimacy of EU economic governance is provided.

This summary builds on *Aiginger et al.* (2012) and *Sachs* (2013) and incorporates the results of further research that has been undertaken within Area 4 since then, in particular the analyses by *Thillaye* (2013A, 2014), *Thillaye et al.*, (2014), *Ederer and Reschenhofer* (2013, 2014A, 2014B); *Ederer and Weingärtner* (2013), *Ederer* (2015) and incorporates the results of further studies outside the area.

5.2 The EMU crisis and its legacy

This section focuses on the EMU crisis' roots and legacy, which casts a long shadow on the EU's ability to steer member states' transition towards a new growth path. It reviews the emergence of the EMU-crisis, summarizes the rescue measures that have been taken since then and provides an overview of further reform proposals.

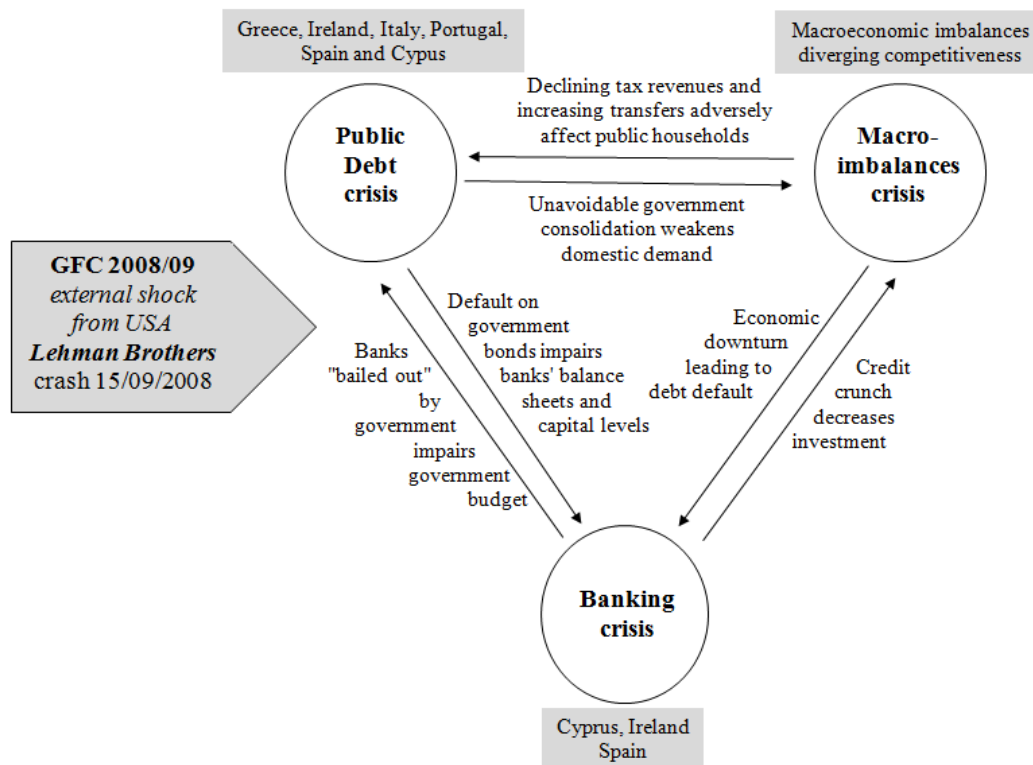
5.2.1 The emergence of the EMU-crisis

The EMU-crisis is mainly viewed as a consequence of a triad of causes (Breuss, 2015): i) unsustainable public debt (public debt crisis), ii) a lack of competitiveness in some member States (macro-imbalances crisis), and iii) irresponsible practices in the financial sector (banking crisis).

Figure 19 illustrates how these developments interacted in a vicious circle that ultimately resulted in the break-out of the euro crises.³³

Figure 19 The "EMU-crisis" consisting of multiple crises in the Euro area

(Vicious circle of debt, macroeconomic imbalances, and banking crises)



Source: Breuss (2015), based on German Council of Economic Experts (2012).

5.2.2 Rescue measures and new EMU economic governance

After the outbreak of the crisis, rescue measures were introduced and new governance structures were created – firstly intergovernmental, then by the Community method – to ensure the survival of the euro and to prevent future crises. Figure 20 gives an overview of the new EMU economic architecture.

³³ Breuss (2015) and De Haan et al. (2016), among others, provide a more detailed discussion, *Ederer and Reschenhofer* (2013, 2014A, 2014B) and *Ederer* (2015) assign a central role to macroeconomic imbalances and take the view that their emergence is rooted in the institutional deficiencies of the EMU.

Figure 20 **New Economic Governance of EMU since 2010**

European Semester			Rescue of States and Banks	
<p>"Six-Pack"</p> <p><i>Fiscal policy coordination</i></p> <p>SGP-III</p> <p>Macro-economic imbalances</p> <p>"Two-Pack" additional national budget monitoring</p>	<p>"Fiscal Compact" (TSCG)</p> <p>* medium-term benchmark of structural budget deficit is 0.5% of GDP</p> <p>* "Debt brakes" in national law</p> <p>Euro Plus Pact</p> <p>* Competitiveness</p> <p>* Employment</p> <p>* Financial market stable</p>	<p>Europe 2020</p> <p>Growth & Job programme</p> <p>* smart</p> <p>* sustainable</p> <p>* inclusive growth</p> <p>Single Market Act</p>	<p>Rescue Measures</p> <p><i>Member States</i> (Greece, Ireland, Portugal, Spain, Cyprus)</p> <p>EFSF (2010-2012)</p> <p>ESM (2012+)</p>	<p>Financial Supervision System</p> <p>* ESFS</p> <p>ESRB - ECB</p> <p><i>3 agencies:</i></p> <p>* EBA London</p> <p>* EIOPA Frankfurt</p> <p>* ESMA Paris</p> <p>European Banking Union (EBU) (2014 +)</p>

SGP = Stability and Growth Pact; EFSF = European Financial Stability Facility; ESFS = European System of Financial Supervision; ESM = European Stability Mechanism; ESRB = European Systemic Risk Board; EBA = European Banking Authority; EIOP = European Insurance and Occupational Pension Authority; ESMA = European Securities and Markets Authority; TSCG = Treaty on Stability, Coordination and Governance in the EMU ("Fiscal Compact").

Source: Breuss (2015).

Fiscal and macroeconomic surveillance

In the field of fiscal and macroeconomic surveillance of member states, several steps have been taken: the 'Six-Pack', the 'Two-Pack' and the Treaty on Stability, Coordination and Governance in the Economic and Monetary Union (TSCG) (Breuss, 2015; Calmfors, 2015; De Haan et al., 2016):

- The 'Six-Pack', consisting of five Regulations and one Directive, which entered into force on 13 December 2011. It does not only cover fiscal policy surveillance, but also macroeconomic surveillance under the new Macroeconomic Imbalance Procedure.
- In the fiscal field, the 'Six-Pack' reinforces both the preventive and the corrective arm of the SGP. The content of fiscal rules (such as the stipulation that government debt exceeding 60% of GDP should be diminishing at sufficient pace) has now been operationalized; and new steps in the excessive deficit procedure (as well as in the new macroeconomic imbalance procedure) have been made semi-automatic through a reversed qualified majority mechanism. Moreover, sanctions in the excessive deficit procedure have become more graduated and can now be applied earlier than according to the original rules and also when the debt criterion is violated.
- The 'Two-Pack' added two more Regulations, entering into force on 30 May 2013. It strengthens the preventive arm of the SGP in obliging governments to submit their (draft) budgetary plan for the coming year to the European Commission. If the Commission detects serious shortcomings, it can require a revision of the budget (European Commission, 2012).
- *National fiscal frameworks* have been strengthened through a number of reforms decided at the EU level, namely the Treaty on Stability, Coordination and Governance in the Economic and Monetary Union (TSCG) (Fiscal Compact), which entered into force on 1 January 2013. They include a balanced-budget rule (a cyclically adjusted deficit of maximum 0.5% of GDP under normal circumstances) and an "automatic correction mechanism" which specifies how

deviations from budget balance should be corrected. A euro area member state that fails to introduce such rules can be brought before the Court of Justice of the European Union.

- Finally, the *macroeconomic imbalance procedure (MIP)* has been introduced with the aim of detecting macroeconomic imbalances at an early stage. If the Commission and the Ecofin Council judge imbalances in a euro area country to be dangerous, an *excessive imbalance procedure* is triggered. Non-compliance with the Council recommendations may lead to financial sanctions that could eventually reach 0.2% of GDP. All decisions on sanctions are made in the Council via Reversed Qualified Majority Voting (RQMV) in order to increase automaticity.

Although these are important steps in the right direction, their effectiveness is not established yet, and will crucially depend on the actual implementation. Regarding fiscal rules, that EU-level decision-making is still a repeated game with strong incentives for a mild stance against problem countries in anticipation of similar treatment of the own country in a similar future contingency. Most importantly, the violation of the no-bail-out clause implies a severe *credibility problem* for any EU-level fiscal rule. Finally, a deficit bias under discretionary policy-making could again re-emerge in the form of a tendency to flout the rules. Establishing and strengthening the role of independent fiscal councils may help to mitigate these problems (Calmfors, 2015).

Regarding the MIP, De Haan et al. (2016) highlight several potential weaknesses. First, the discretionary room of manoeuvre is relatively large. Second, the decision in the Council on the existence of an excessive imbalance is not made by RQMV. Third, there is a lot of discussion possible on the necessity and the effects of specific policy measures to contain the imbalances. Giavazzi and Spaventa (2010) point out that it is difficult to conceive of enforceable corrective actions. This increases the risk that recommendations are diluted in the Council. Furthermore, the approach is of much less use for prevention, as the recommendations in the preventive stage of the procedure are non-binding. Recommendations only start to become binding when imbalances are excessive, which means that they are already pretty large and difficult to reverse quickly.

Crisis mechanisms

When the EMU-crisis erupted, problems were amplified by the fact that the architecture of EMU did not contain provisions for the resolution of a major sovereign debt crisis (De Haan et al., 2016). As a response, the (EFSF and the permanent) European Stability Mechanism have been established to provide financial assistance to euro area member states under strict conditionality.

The backstop mechanism implemented by the ESM is certainly an improvement and helped to stabilize the situation in Ireland, Portugal, Spain and Cyprus (whereas Greece is still on the brink to insolvency). Whether this mechanism is sufficient to prevent future crises is debated, since the ESM rescue is limited in size and can hence not by itself fully rule out contagion between EMU member states in the case of large shocks (De Haan et al., 2016). In the current set-up of the ESM (with only a small proportion of pre-funding), this is further amplified by the fact that one country's (additional) borrowing is another country's (additional) lending (Bijlsma and Valleé, 2012).

Banking Union

Decentralised, diverse and insufficient banking regulation and increasing uncertainty led to a fragmentation of financial markets during the crisis and a fatal link between states' and banks' solvency (Aiginger *et al.*, 2012). European States had to play the role of the "lender of last resort" causing high public debt through bank bailouts. In response, the European Council therefore decided in June 2012 for a European Banking Union, which involves three elements (Breuss, 2013 for a detailed discussion).

- *Single Supervisory Mechanism (SSM)*, moving supervision of large banks to the ECB as of November 2014 and involving stress tests.
- *Single Resolution Mechanism (SRM)* to deal with bank resolution, which will be applicable as of 2016. A Single Resolution Board (SRB) and Single Resolution Fund (SRF) have been established, though the latter will be only fully operational after a transition period of (at most) 8 years when it has reached its targeted size of € 55 billion.
- *Deposit Guarantee Scheme (DGS)*: so far, this has received a low priority as national schemes have been harmonized. A pan European system is currently not under consideration, in 2019 the Commission will submit a report, and, if appropriate, could put forward a new legislative proposal.

The banking union is generally seen as a crucial and major step forward. A weakness is that the long transition period before the SRF will reach its target of € 55 billion, though this was unavoidable as creditor countries were not willing to accept a mutualisation of the risks from the past (Gros, 2013). Moreover, Gros and Schoemaker (2014: 537) argue for combining resolution and deposit guarantee at the European level to allow swift decision making and to avoid inter-agency conflicts.

Further measures to ensure financial stability are the establishment of the European Systemic Risk Board (ESRB); it may issue non-binding recommendations to Member States when risks to financial stability emerge. Another improvement is the (upcoming) introduction of macro-prudential policy frameworks in EMU Member States, including the possibility for European coordination. The Capital Requirements Regulation and Directive (CRR/CRDIV) allows national central banks (NCBs) to decide on the countercyclical capital buffer for banks. If necessary, the ECB Governing Council may overrule these decisions and decide on a stricter buffer (De Haan *et al.*, 2016).

In the field of monetary policy it seems warranted to clarify the role of the European Central Bank (ECB) as lender of last resort to avoid the occurrence of liquidity crises before turning into solvency crises. In the face of increasing instabilities in the financial system, the European Central Bank (ECB) has already taken on much broader responsibilities than originally foreseen, both towards banks (Long Term Refinancing Operation) and sovereigns (Securities Market Programmes and, most recently, Outright Monetary Transactions). Yet, these moves have met criticism, triggered lawsuits, and interventions therefore have, for too long, been unsystematic and have not sustainably reduced interest rates.

Finally, apart from these institutional reforms, there have been initiatives by the European Commission to gear economic growth in the EU. Two important projects are

- The European Commission's Investment Plan for Europe (EC IPE), also known as the "Juncker Plan" announced in November 2014: it aims at triggering private investments in the real

economy of at least € 315 billion over a three years fiscal period. A critical review is given by Gros (2014).

- A recent initiative is the creation of a Capital Market Union or a Single Market for Capital.³⁴ By reducing the barriers of cross-border investment growth the Commission expects a boost for growth in the EU. A discussion is given by Danielsson et al. (2015).

5.2.3 Further proposals on reforming EMU governance

Many proposals to deepen European (EMU) integration have been put forward since 2010. The most far reaching proposals suggest the establishment of an economic government in the euro area, accountable to the European Parliament, with an own budget and the powers to take over decision-making on national budgets or at least to veto them in certain circumstances (e.g. Glienicker Gruppe, 2013; Groupe Eiffel Europe, 2014; Benassy-Quéré and Vallee, 2014).

More moderate (but still far reaching and politically highly sensitive) proposals relate to the establishment of a fiscal union, which can be grouped along two lines³⁵: i) joint guarantees of the public debt of individual euro area members to underline the credibility and irreversibility of the euro, thereby improving access to financial markets and reducing financing costs; ii) fiscal transfer schemes to deal with asymmetric macroeconomic shocks that could partly substitute an own monetary policy in the case of country-specific shocks.

Related to the first track, an expert group (Tumpel-Gugerell et al., 2014) established by the European Commission considers two options:

- *A Debt Redemption Fund and Pact*, involving a temporary mutualisation of debt (over approx. 25 years) exceeding 60% of GDP.
- *Eurobills*: centrally-issued government fixed-income securities up to a predefined, rather short-term maturity (up to one or two years), jointly issued by the euro area member states; member states would have to give up the right to issue short-term debt (with the same maturity).

The idea of Eurobonds (e.g. De Grauwe and Moesen, 2009) extends the concept of Eurobills to the medium- and long run; they would also be centrally issued and jointly guaranteed bonds for financing the euro area Member States' public debt. To avoid moral hazard, the sole issuer of Eurobonds would have to be an independent Budgetary Authority, which is also in charge of the enforcement of the European fiscal rules (De Haan et al., 2012; Gilbert et al., 2013). An overview of proposals relating to joint guarantees of public debt and with different designs is given by Fuest and Peichl (2012).

Related to the second track, the idea of a fiscal transfer system is quite old (e.g. Pisani-Ferry et al., 1993). A more recent proposal is that of a European stabilization fund based on member states deviations from the output gap. An analysis of its distributional consequences is for instance given by Delbecq (2013). Obviously, the current EU budget is way too small to play such a role.

³⁴ http://europa.eu/rapid/press-release_IP-15-4433_en.htm

³⁵ Various options for political, fiscal, and banking union are discussed in Franklin et al. (2013).

Hence, such an instrument would have to be financed by EU-wide taxes or fiscal transfers between national budgets would have to be triggered based on differences in estimated output gaps.

Several recent proposals have instead focused on unemployment insurance. The idea is that such a system would result in automatic fiscal transfers that immediately reach citizens with a high propensity to spend in countries facing a downturn. It should be based on cyclical (rather than structural) unemployment caused by a drop in aggregate demand, a "relatively low common denominator" of the national rules, and the principle that individual member states can add unemployment contributions to the "minimum" unemployment insurance by the EMU (Dullien and Fichtner, 2013; Andor et al., 2014; Claeys et al., 2014). As an alternative to setting up a pan-European system, Beblavý et al. (2015) suggest a reinsurances system; they argue that such a system would provide, for a small average contribution, large absorption capacities in case of large shocks to labour markets.

In order to tackle macroeconomic imbalances by procedures beyond the MIP, some authors also call for more symmetry in the field of monetary and fiscal policy resulting in an adjustment within the euro zone that would contrast with the current asymmetric adjustment supported mainly by the crisis countries (Sapir, 2014). In the field of fiscal policy, this would imply that restrictive fiscal policy in crisis countries is accompanied by looser policy in countries that enjoy fiscal space. In the field of monetary policy this would imply communicating and implementing that achieving both disinflation in the GIIPS countries and the 2% objective implies an inflation rate of probably close to 3% in core euro zone countries.

Ederer and Reschenhofer (2014B) and *Ederer* (2015) argue that demand side measures will not suffice to permanently reduce imbalances within EMU. The reduction of the large gaps in price competitiveness is a precondition for deficit countries to improve their positions within global value chains and to support the establishment of such industries. Since labour and social policies nevertheless are still under the responsibility of member states, wage setting in the EU can therefore only be coordinated through a mix of (non-binding) country guidelines as part of the country-specific recommendations of the European Semester on the one hand and trans-national collective bargaining processes on the other hand. The guidelines could thereby set the country specific productivity growth plus the inflation target of the ECB as a measure for wage increases. Wage coordination however is not simple to introduce into the existing governance framework and might lack the necessary legitimacy.

While the aforementioned proposal have different design options and differ in various details and in how far they go, all of them involve a basic tradeoff between increased risk-sharing (and less market adjustments) and political feasibility due to moral hazard problems and fears of establishing a transfer union without democratic legitimation. Hence, there is no unequivocal consensus – at least from a purely economic perspective – that a substantial deepening of European integration is required, a dispute that reflects different weights that are assigned to the elements of the aforementioned tradeoff.

Another case for further integration that is sometimes put forward is that a more integrated union would be a win-win situation for member states, e.g. that debt mutualisation (Eurobonds) could bring down average interest rates of the euro area as a whole. Yet it remains questionable,

whether reaping these gains requires that each (most) of the individual member states have become credibly more resilient to shocks by bringing down their debt overhang, reducing their macroeconomic imbalances and restoring their banking sector.

5.3 Reforming EU economic governance: options and parameters

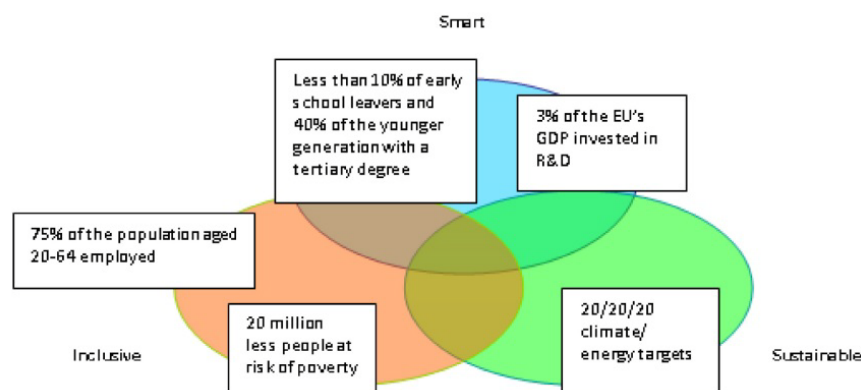
This section takes a broader perspective on EU economic governance beyond the mere focus on EMU crisis management. It starts from the assumption that economic and social convergence towards a new growth path is particularly in the interest of EMU members and tentative members, but also matters to all EU member states. It reflects on possible future governance changes from the point of view of the Europe 2020 long-term goals.

5.3.1 Europe 2020 and the European Semester

European Economic Governance is characterized by a patchwork of legal bases and methods. The fiscal and macroeconomic surveillance procedures that have been reinforced or created as a response to the sovereign debt crisis are today part of the European Semester, the overarching mechanism for economic policy coordination. Yet the European Semester is also the place where the implementation of the Europe 2020 strategy is monitored (*Thillaye, 2013B*).

The Europe 2020 strategy is a long-term growth strategy for all European Union member states based on three pillars comprising of economic, social and environmental goals. The mutuality and complementarity between pillars and goals (or headline targets) are described in the following diagram:

Figure 21 The structure of Europe 2020 objectives



Note: The environmental targets have been adjusted recently; the new climate/energy targets for the year 2030 are 40/27/27, i.e., to reduce greenhouse gas emissions by at least 40%, increasing the share of renewable energy to at least 27%, and to increasing energy efficiency by at least 27%.

Source: *Thillaye* (2013B).

The Europe 2020 strategy is generally seen as an improvement in comparison to its predecessor, the Lisbon strategy, because of the balanced and consensual definition of long-term goals for the member states, which rests on the three dimensions of sustainability and thus widens the limited

focus of the Lisbon strategy on economic growth and competitiveness. However, *Thillaye* (2013B) emphasizes the problem of a capability-expectations gap, i.e., the existing governance structure may not be able to fulfil the expectations underlying the Europe 2020 strategy. In fact, the performance so far has been disappointing. The EU and its member states are heading towards missing important quantitative targets set in the Europe 2020 strategy, in particular the poverty, employment and research targets (European Commission, 2014; Aiginger, 2014A).

It is fair to say that the financial and economic crisis and its repercussions have created an environment which is not conducive to long-run reforms; the focus on short-term crisis management and emergency measures has been unavoidable and ensured the survival of the EMU on a five to ten year horizon (*Aiginger et al.*, 2012). Yet the priority now should be to rebalance the European semester towards the goals set out in the Europe 2020 strategy, and to adopt steps towards implementing a long term vision of the EU in 2050 as laid down in Aiginger (2014A).

There is large agreement that – in order to achieve these ambitious goals – improvements in European economic governance are required, since it suffers from several deficiencies and blind spots in its current form (*Thillaye*, 2013B; *Aiginger et al.*, 2012; *Sachs*, 2013):

- There is a weak link between short-term and long-term goals: the long-term objectives formulated in the Europe 2020 strategy, as well as national and supranational consequences tend to be sidelined in the procedures and methods leading to country-specific reform recommendations within the European Semester.
- In practice, the three pillars of the Europe 2020 strategy stand side-by-side (despite their conceptual overlap), no interconnections, spillovers or tradeoffs are explicitly addressed.
- Old and new mechanisms of economic governance, such as the Stability and Growth Pact and the Macroeconomic Imbalance Procedure (MIP) show a strong disciplinary bias and prioritize convergence in terms of fiscal balance and competitiveness, but not towards the long-term vision of a 'social-market economy' as laid down in Article 3 of the Treaty of the European Union.
- The current decentralized approach with national fiscal policies (restricted by common rules) is paying too little attention to aggregate demand and collective performance; a more symmetric view, in the collective interest of all EU members, seems warranted.
- In particular, insufficient macroeconomic coordination and misaligned wage and productivity developments translated into significant competitiveness divergences with high deficits in current accounts in some countries and high surpluses in others in the late 2000s. The hope that the monetary union would by itself spur convergence, turned out to be overly optimistic. No measure to ensure greater symmetry in wage developments has been taken since 2000s.
- A widely acknowledged weakness of EU governance is the difficulty of enforcing the commitments made by national governments. EU economic coordination is politically sensitive and must be treated with care. Governance restricted to limiting the policy scope of the member states through the use of red lines and 'naming and shaming' might not prove sustainable politically.

- The limited EU budget, mainly financed by national contributions, severely restricts the EU's and the Commission's room for maneuver in order to incentivize the implementation of reform recommendations and national policies conducive to the EU 2020 goals.³⁶
- As reflected by the cumbersome European Semester, the decision-making system has become more complex in the public's perception and its accountability less clear, generating a widespread sentiment of 'diminished democracy' and legitimacy among citizens, stakeholders and policy makers.

In spite of lasting discussions about fundamental design flaws and the strong rationale behind the idea of a federal 'leap forward', EU governments and citizens do not yet appear ready to pool further sovereignty and resources as a way to improve the EU's delivering capacity. More optimistically, one could argue that the crisis has paved the way for fundamental reforms but that more time is required for governments, stakeholders and citizens to develop a shared vision of the EU's future and the commitment to taking the steps necessary for its implementation.

Against this background, a two-step approach seems reasonable: first, acting within the legal framework of existing treaties in the short-run (section 5.3.1). Second, taking further steps and implementing more fundamental reforms in the medium- to the long-run (section 5.3.2). At the same time, attention should be paid to ensuring (perceived) legitimacy, accountability, and transparency of EU governance (section 5.3.3).

5.3.2 Improving coordination within the boundaries of existing treaties

Thillaye (2013A) identifies decisions that can be made within the coordination frameworks laid down by existing EU treaties on how to increase the quality and the impact of EU economic governance in order to facilitate the socio-ecological transition of European economies and their convergence. At a general level, the impact of European economic governance can be enhanced along two lines: i) by extending the scope of (macroeconomic) coordination to policy areas beyond its present focus on fiscal policy and competitiveness (section 7.3.2.1), and ii) by improving the quality and impact of coordination (section 7.3.2.2).

7.3.2.1 Extending the scope of coordination: Social and wage policies

Given their large economic impact and relevance, national welfare policies and wage-setting systems represent an important factor of EU convergence or divergence. Hence, social and wage policies are obvious areas to be targeted for broadening the scope of economic coordination. *Thillaye* (2013A) suggests two fields of action:

Reviving the social dialogue at EU level and making greater use of the 'horizontal social clause'

The European social dialogue involving social partners has led to the adoption of several legal provisions over the last two decades, for instance on maternity and parental leaves, working time, workers participation, part-time work and fixed-term contracts, in the wake of the Charter of Fundamental Social Rights of Workers signed in 1989.

³⁶ Schratzenstaller (2013) discusses reform needs and options for the EU's own resources system.

However, the EU's ability to develop genuine legislation in the social field is limited, e.g., 'Pay' is explicitly excluded by EU treaties, preventing, e.g., the implementation of binding EU standards for a minimum salary or some other form of wage coordination. Yet there is a growing awareness of the need to tackle divergent practices in EU member states. This has led, for instance, to a joint Franco-German communication in May 2013 inviting euro area members to implement 'minimum wage floors defined at national level'. Although there is no consensus on the method that should be used, non-legally binding guidelines could be adopted in the euro area. Whether such measures do in fact lead to changes in national law remains to be seen, but in the absence of EU legislative competence this appears to be the only realistic approach to increase awareness, to trigger discussions and to develop an understanding towards common standards.³⁷

In fact, such soft forms of policy coordination may have much more impact than generally perceived. Lelie and Vanhercke (2013) show that the 'social OMC' (Open Method of Coordination) has greatly advanced common understanding and analytical standards during the last decade, from which further initiatives could be undertaken. The simplistic opposition of 'hard' vs. 'soft' law might be misguided.

Obviously, further progress along these lines and procedures is mainly a matter of political will and should not be left towards ad-hoc country (or country-pair) initiatives. A more promising and systematic approach could be to incorporate an assessment of social imbalances (as well as imbalances in other policy areas, e.g., environmental issues) more systematically and prominently into the European Semester, which is the most visible avenue of European economic coordination.

Rebalancing the European Semester

While the European Semester is often presented as the key monitoring framework of the Europe 2020 Strategy, *Thillaye* (2013B) argues that, in reality, its legal basis draws strictly on the Macroeconomic Imbalance Procedure and the Stability and Growth Pact. Therefore, it is characterised by greater pressure and the shadow of possible sanctions in the field of fiscal and macroeconomic targets only.

The practice so far shows that the European Commission attempts to strike a balance between fiscal consolidation, growth and investment, but that country-specific recommendations are more narrowly focused on the correction of fiscal and macroeconomic imbalances. However, with recommendations negotiated months ahead with national governments, sometimes involving social partners and national parliaments (for instance in Belgium and the Netherlands), the European Semester provides a well-designed space for evidence-based deliberation and high level policy debates. *Thillaye* (2013B) suggests the following improvements to broaden the scope, the impact and the transparency of the European Semester:

- *Submit country-specific recommendations to a 'Europe 2020 compatibility test':* While recommendations based on the Stability and Growth Pact and the Macroeconomic Imbalance Procedure (MIP) are not necessarily in conflict with the 2020 targets, potential tradeoffs should

³⁷ It should be noted that whether minimum wages (and hence also coordinated minimum wages) are an effective instrument of social policy is still debated in the literature, e.g. MaCurdy (2015) for a recent critical view on the US.

be considered. As the Social Protection Committee has argued, 'social policies alone cannot deliver on the Europe 2020 poverty target' but have to be underpinned by other accommodating policies in the fields of employment, taxation and education (Social Protection Committee, 2013).

- *Implementing a social equivalent of the scoreboard of the Macroeconomic Imbalance Procedure:* Given the weaker legal provisions underpinning social coordination, the idea of a 'social imbalance procedure' of equal legal force appears unrealistic. However, the Social Protection Performance Monitor (SPPM) set up by the Social Protection Committee and endorsed by the Council in October 2012 provides EU policy-makers and leaders with a 'dashboard' of social indicators which has a potential of high visibility. Another step into this direction has been taken recently: A "Draft Joint Employment Report", including a "Scoreboard of key employment and social indicators", was published in November 2014 alongside the Annual Growth Survey, which kicked off the European Semester 2015.
- *Linking conditionality of the EU budget to criteria beyond macroeconomic measures:* As it stands, the macroeconomic conditionality clause attached to the Cohesion Policy budget for 2014-2020 sanctions the non-respect of macroeconomic and fiscal recommendations. Using conditionality to support structural reforms in the social field could be at the core of so-called 'contractual arrangements', or 'reform contracts'. In the communication on a 'Convergence and competitiveness instrument' (2013), the Commission indicates that 'financial support would also strengthen EMU's social dimension', for instance by gearing member states funding towards 'the modernisation of vocational training systems or increased effectiveness of labour market policies'. *Thillaye* (2013B) argues that a more explicit link, not only to the Employment Guidelines but also to social policy, e.g., to recommendations included in the 'Social Investment Package' communication, would give 'reform contracts' a more long-term and social twist.

A specific proposal for contractual arrangements along these lines has been put forth by Aiginger (2014B) under the heading silver rule: member states should be allowed *temporary* (e.g. for two years) violations of the fiscal pact for public investment in categories particularly relevant for long run growth to be defined by the European Commission, particularly intangibles.³⁸ Specifically, *increases* of public expenditures in these categories up to 1% of GDP would be subtracted for the deficit limit defined in the fiscal pact. This would be conditional on member states indicating (e.g. five) structural reform projects in their economy (e.g. labour market, product market, structure of public expenditure and taxes, business start-ups, pension systems). While the categories for intangible investment would be decided by the commission, the criteria for the "extra deficits" would be controlled by independent authorities (chosen by the European Parliament). The structural reforms should be designed to generate savings in public expenditures in order to enable continued investment into growth drivers without endangering public debt sustainability. The advantages of such an approach would be that it can be invoked quickly during periods of anemic investment,

³⁸ Such categories could be research, education, universities, early childhood investment, requalification, renovation and infrastructure maintenance and upgrading, improvements of energy efficiency for existing structure, closing bottlenecks in energy transition, broadband nets in rural areas, renewable energies.

member states would maintain ownership of the reforms, and that their monitoring would be carried out by independent authorities.³⁹

7.3.2.2 Improving the Efficiency of Coordination

Besides extending the scope of coordination, *Thillaye* (2013A) proposes institutional adjustments to improve the quality and impact of coordination mechanisms in place:

EU budget conditionality and further forms of 'contractual arrangements':

In light of EU governance weaknesses in enforcing the commitments made by national governments, several initiatives have been taken: In March 2013 the Commission proposed putting in place a new mechanism of 'ex ante coordination', which requires member states to submit detailed information about envisaged reforms. The Commission then provides the Council with an assessment of the reform's effectiveness and of its potential spillovers on the functioning of the euro area. While useful from a collective point of view, this approach does not incentivize member states to initiate reforms; moreover, the prospect of the EU's interference in national policy-making could even act as a deterrent.

The idea of 'reform contracts', put forward by the European Council end of 2012 goes one step further. The Commission has suggested that these contracts build '*on the relevant Country Specific Recommendations*' and, for member states under macroeconomic surveillance, on '*measures addressing competitiveness, promoting financial stability and improving the functioning of labour, product and services markets and thus the adjustment capacity of the economy*' (European Commission, 2013). This procedure could establish an unambiguous link with the EU budget if new funding were replaced by conditional EU payments; an experimental phase is envisaged in order to see if such a mechanism can be 'an effective and cost efficient way of promoting reform'.

Thillaye (2013A) argues that, if generalised to all member states, 'reforms contract' could change the face of EU coordination. Nevertheless, they raise two issues. First, it is unclear whether the stick of EU payments suspension or the carrot of additional support will, indeed, boost reforms. The limited capacity of some member states to absorb EU money, and evidence of poorly targeted spending, make an increasing EU budget conditionality the best option. Second, the top-down approach and conditionality of contracts could damage rather than increase ownership at the national level. An alternative to linking reform contracts to country-specific recommendations would be to invite member states to make a voluntary request on the basis of national reform programmes and in line with a broad set of EU objectives. The EU should avoid imposing specific measures from above.

Voluntary smaller-scale coordination between euro area countries and 'outs'

The idea of a two-speed Europe is not new. In light of the recent crisis and the stronger case for more coordination in the euro area, some authors propose to bypass the constraint of discussing

³⁹ The Juncker investment plan appears to target into this direction at EU level, since investments for this plan have been announced to be exempted from the excessive deficit procedure of the SGP.

with 28 member states (Piris, 2012), a view that is not confined to the 'ins' of the Eurozone (Chalmers et al., 2013).

Enhanced cooperation on a smaller scale can be achieved in three ways: On an ad hoc basis, in the spirit of Article 136 TFEU, which opens the door to mechanisms strengthening 'the coordination and surveillance of budgetary discipline' and 'economic policy guidelines' in the euro area. The joint Franco-German communication of May 2013 suggests strengthening 'economic policy coordination' by developing a more complete set of indicators relevant to the euro area's performance, including social imbalances. It invites the Commission to monitor 'Europe 2020 social objectives in the framework of the European Semester' contemplates 'minimum wage floors' for all euro area members.

Enhanced cooperation is a second way of intensifying coordination among a smaller group of member states. However, *Thillaye* (2013A) argues that the unimpressive number of initiatives so far, their limited scope and the strict EU law compliance requirements cast doubt on the relevance of this instrument for the Eurozone. Piris (2012) makes the case for a third option, namely 'legally building a two-speed Europe'.

Obviously a more active and positive agenda of coordination is more likely to be adopted when done on a limited scale. However, such an instrument should be used with care in order to avoid developing centripetal forces within the EU and to avoid creating resistance in member states to 'entering' the euro zone. Hence, 'outs' should not be left entirely out of the discussion process and should be invited to join on a voluntary base.

5.3.3 Parameters for deepening European Economic Governance

As outlined above there is room to make more of the possibilities opened by the treaties. *Thillaye* (2013A) points out that the choice for coordination, nevertheless, should not be idealized. The diversity of national models and competitiveness strategies makes it very difficult for member states to agree on common performance criteria. Moreover, piling up procedures of surveillance and contractual arrangements does not facilitate transparency, democratic participation and accountability.

Moreover, different policy areas call for different solutions and different degrees of EU interference. Considering the case of Germany and France, *Busl and Seymen* (2013) find that labour market reforms have the potential to improve economic conditions substantially, though spillovers of such reforms seem to play a minor role. Moreover, *Sachs and Schleer* (2013) emphasize the dependency of the reform impact on the country-specific regulatory framework. This makes a strong case for incentivizing and supporting, but delegating the specifics of labour market reforms to the member states.

In contrast, *Rozmahel et al.* (2014) find strong spillovers in the field of fiscal policy, namely that fiscal indiscipline and dissimilarity together with the non-Euro area membership have negative effects on correlation of business cycles in the EU. *van Aarle* (2013) argues that the existing EU budgetary governance framework is not adequately equipped to enforce fiscal surveillance and consolidation in the member states. Drawing on concepts of fiscal federalism, multi-level governance and open coordination, hierarchical control systems, and a macro-finance perspective

on budgetary governance he advocates transforming fiscal governance in the euro area from the current ad-hoc-, procedural-, indicator- and rule-based approach to an integrative, process-oriented, diagnostic and self-correcting framework. Such a framework would have to include a diagnostic toolbox enabling to systematically identify shocks and prevent the transmission of shocks; take into account the presence of real and financial spillovers in EU economies; integrate stress tests and early warning systems into macroeconomic analysis to detect stress in fiscal balances, financial markets and the real economy; analyse factors that contribute to resilience by considering the comparative EU evidence on institutions and institutional reforms.

Notwithstanding the fact that there is no one-size fits all solution, some general guidelines, along which further steps to deepen European economic governance can be outlined. Building on Pelkmans (2006) and the impact assessment approach by the European Commission, *Thillaye et al.* (2014) emphasize the dimension of reform implementability and suggest that each reform proposal should address the following questions:

- Do existing or potential spillovers justify EU intervention?
- Is the distribution of preferences conducive or adverse to EU intervention?
- What are the risks of moral hazard?
- What are the potential implementation costs and flaws?

Hence, any proposal seeking to increase the EU's interference into national policy-making should start with a clear economic justification, while taking the heterogeneity of national preferences into account. Thereby, the risks of moral hazard and institutional barriers should also be systematically internalised in the assessment.

This multi-criteria analytical framework is then applied to assess three possible innovations of economic governance: rule-based wage coordination, contractual arrangements for reforms, and a stabilisation fund for the euro area. Beyond the predictable clash of economic rationales and political hurdles, *Thillaye et al.* (2014) find that reform ideas tend to overlook the difficulties arising at the implementation stage. Diverse wage-setting systems, low administrative capacities, and statistical uncertainty for instance all warn against 'more EU money' or 'EU interference'.

Like at national level, the limits of technocratic governance have to be taken into account when devising new institutions for the EU. Wage coordination might not be the simplest and most legitimate way to tackle current account divergences; contractual arrangements risk being seen, at best as a cumbersome process fraught with political motivations, and at worst as unjustifiable external interference, in the absence of a shared diagnosis over the reforms needed; a cyclical stabilisation tool at EU level touches the hypersensitive nerve of cross-EU trust and solidarity despite the apparent simplicity of possible designs.

Deepening European economic governance, therefore, requires paying particular attention to a series of parameters that would impact on the expected optimality of new institutions.

5.3.4 Improving the legitimacy of European economic governance

Legitimacy (or public buy-in) finally needs to be taken into account when reflecting on the future of EU economic governance. Recent governance changes in EMU have produced a blurry picture of technocracy and intergovernmentalism. The crisis has seen first the sidelining of the Community

method, only to reintroduce it in a very disciplinary bias. The ESM treaty only gives a consultative role to the European Commission. The European Parliament has no co-legislative power during the European Semester. The pivotal role of the European Council in designing an inter-state insurance system and in deciding on its use gives the impression of an EU governed by EMU's biggest countries. This new institutional balance is further complicated by the unsolved and unclear relationship between the EU27 and the developing EMU institutions. Further integration in EMU will raise these tensions even more (*Aiginger et al.*, 2012).

Thillaye (2014) analyse whether EU economic governance is sustainable from a legitimacy point of view, given that Europe's cultural and institutional diversity will remain a long-lasting feature. His point of departure is the observation that, starting out from the 'Broad Economic Policy Guidelines' and Maastricht convergence criteria of the 1990s, EU economic governance has developed into a far more complex set-up (in particular for EMU countries) and become more intrusive over the last years.

With EU and EMU economic governance taking ever more prominence in member states' policy agenda, the question of the democratic legitimacy of the EU has become more acute. The question is whether democratic innovations might be necessary to improve the acceptability of extended supervision and reinforced mutual commitments.

Thillaye (2014) investigate this issue along three lines: the EU's 'input legitimacy' (its perceived democratic deficit), its 'output legitimacy' (its perceived inability to bring about concrete benefits to the public) and 'legitimation' from a dynamic perspective. These concepts shall be discussed in the following:

Input legitimacy

There are basically two views on how to improve input legitimacy:

- i. adopting state-like institutions at the EU-level, using more majoritarian politics, extending the European Parliament's prerogatives, making the European Commission more responsive and accountable (Hix, 2008). Some authors go even further, calling for a Eurozone 'political union' in which a genuine economic government would be accountable to a Eurozone assembly (Habermas, 2013; Glienicker Gruppe, 2013; Groupe Eiffel, 2014).
- ii. enhancing the role of national democracies within the EU polity (Nicolaidis 2012; Magnette and Papadopoulos, 2008: 5). This view holds that taking the nation-state as a model for the EU is misguided, since the EU lacks a single 'pouvoir constituant' and the diversity of European identities and peoples imposes a particular style of consensual politics. *Thillaye* (2014) argues that this approach would require treating all countries on an equal footing and giving national parliaments a more important role in discussing EU orientations and national implementation.

The second approach appears to have been the one predominantly pursued so far, an impression which is also enforced by the rise of 'deliberative intergovernmentalism' through the European Council (Puetter, 2012). The Roadmap "Towards a genuine Economic and Monetary Union presented by Herman Van Rompuy in December 2012 seems to embrace this logic, but not wholeheartedly. While it recognizes that national parliaments and social dialogue procedures are central to the section on "democratic legitimacy and accountability", it falls short of making any

specific prescription except the setting-up of the inter-parliamentary conference foreseen by Article 13 of the Treaty on Stability.

Accordingly, *Thillaye* (2013B, 2014) concludes that transforming the European Semester into a high-level political debate going beyond technocratic governance, with an increased interaction between national parliaments, social partners and EU institutions when it comes to discuss and determine reform programmes would not only improve the effectiveness but also the legitimacy of European economic governance. The Macroeconomic Dialogue between Presidency, Commission, ECB and Social Partners, which is an established procedure, would provide an appropriate forum and should be strengthened and intensified.

Output legitimacy

While the perceived input legitimacy of EU governance has to be tackled, there is probably an even stronger case for improving the EU's output legitimacy. Innerarity (2014) argues that, in contrast to the nation state, legitimacy of supranational institutions crucially depends on output legitimacy, given that these institutions have been built to resolve problems that cannot be addressed at the level of the nation state.

This requires that member states define common and shared targets. *Thillaye* (2014) sides with Majone (2012) who argues that resolving the broader legitimacy crisis of the European project requires a clear determination of the goals of the EU project. He advocates a clarification on the objectives of EU economic governance along the lines of the EU 2020 strategy.

Legitimation of EU interference with national politics

In the complex environment of eroded sovereignty, calls for as strict adherence to normative benchmarks derived from past habits and accomplished rights and obligations seem misguided. Rather, "political legitimacy is never fully given but requires constant legitimation" (Severs and Mattelaer, 2014: 7.). In the same vein, Innerarity (2014) emphasizes the difference between 'acceptance' (based on public support) and 'acceptability' (based on the quality of decisions and respect for democratic institutions) and argues that: "there is no legitimate democracy without the possibility of governing outside popular will" (Innerarity 2014: 16). Hence, legitimation "should be based on a combination of different criteria of legitimacy [...] in some areas competence will be more important than participation; in others, public opinion should correct the unilaterality of experts. Therefore the legitimacy of the EU can only consist of a combination of different strategies" (Innerarity, 2014: 26).

Patterns of legitimation in the practice of EU economic governance

Thillaye (2014) uses the concept of legitimation taking 'input' and 'output' factors into account as part of a dynamic process of negotiation and justification. He postulates four key factors of legitimation of EU interference with national politics:

- a strong justification in terms of both the EU collective interest and the national interest of member states;

- sufficient leeway for national democracies, especially on the means (obligation of results, but not of means);
- recommended reforms must be seen not only as effective but also as 'fair',
- incentives or rewards for reforms can act as a 'sweetening pill'.

Three case studies related to the implementation of country-specific recommendations to Italy, France and Germany are then judged in light of these criteria: Italy's labour market reform in 2012, France's pension reform in 2013, and Germany's introduction of a minimum wage in 2014. *Thillaye* (2014) provides a case-by-case study and considers the timing and justification of the reforms, the financial support provided by the EU and traces the public opinion during the process of negotiation and implementation.

Based on his analysis, *Thillaye* (2014) identifies the following similarities among the processes and common pattern of legitimation:

- Reforms do not come 'out of the blue'; their timing appears both to be dictated by domestic agendas and to reflect a context of mounting pressures, either by other governments or financial markets.
- There is no such thing as an inflexible injunction from 'Brussels'. Although there are different degrees of interference depending on the extent of the emergency, recommendations can be amended in the Council in the sense desired by national governments and parliaments. The EU also generally takes into account both the EU and the national interest in its reasoning and wording.
- There is significant space left for national democracy. In the three cases, social partners and national parliaments had time to discuss and amend governments' projects.
- The three governments tried to present their proposal as both a matter of distributive justice or fairness, and as a question of national economic or fiscal responsibility. By contrast, justification in the name of the EU's collective interest was absent.
- Establishing a direct link between EU recommendations and the EU's approval ratings would require further research. In France and Italy – two countries facing difficult economic and social situations – the government lost more unpopularity than the EU but this did not prevent reforms from being enforced.
- In the French and Italian cases, governments used reform as leverage for obtaining either financial support from the ECB, or greater fiscal flexibility.

In sum, *Thillaye* (2014) identifies patterns of legitimation specific to EU economic governance. The EU is respected and obeyed – though not liked – when its recommendations are 'supported' by domestic or international (market) pressures, in particular, when its reform requests are linked to financial support or fiscal leniency. Resistance occurs when recommendations are overly specific and overlook the role that national democracies have to play.

Thillaye (2014) concludes that an improvement of EU legitimacy in the field of economic governance does not necessarily call for radical reforms. Above all, member states have to learn further to coordinate closely and to manage their differences collectively, with a sense of equal rights and duties. This will require continued communication efforts by EU institutions and national

governments on why reforms are needed, both from an EU and a national point of view, and which goals are pursued by them. National parliaments and stakeholders should systematically avail themselves of the role they have to play when it comes to translating EU broad prescriptions and objectives into specific measures.

5.4 The road ahead, conclusions

As outlined above, the current structure of EU economic governance shows deficiencies that make the achievement of the ambitious Europe 2020 strategy unlikely. Several proposals to rebalance the European Semester towards the comprehensive long-term goals have been put forward, such as:

- Establishing social and ecological scoreboards enjoying equal visibility and relevance as macroeconomic indications;
- Providing member states with extra room for manoeuvre when they invest into long-term capabilities;
- Improving the legitimacy of economic and social governance through enhanced transparency, continued communication efforts by European institutions and member states, and a larger involvement of the European and national parliaments.

However, the debate on EU economic governance is still overshadowed by the need to return to stability in the euro area. Since 2010, all major weaknesses of the previous EMU architecture have been addressed in one way or the other. Whether these measures are sufficient is subject to debate. On the one extreme, authors like De Grauwe and Yi (2015) argue that the new economic governance does not protect the euro zone from future crisis. They attribute a large role in the stabilization process to the ECB stepping in as a lender of last resort, but question its credibility to act likewise in future crises given the lack of consistent support through all member states. These authors, therefore, advocate gradually implementing a fiscal and political union to underline the credibility of the European project.

It should be added that the arguments in favour of a (fiscal and) political union stem from the fact that successful currencies have historically always been linked with successful nation states (Goodhart, 1998). Yet, as Hoeksma and Schoenmaker (2011) and van Riet (2014) argue, the European Union is a supranational arrangement that already performs many tasks that traditionally were the prerogative of nation states. It hence, remains unclear how much more political integration would be necessary to keep the monetary union stable.

In fact, on the other extreme, authors like Cochrane (2011) identify banking misregulation as major reason for the crisis and advocate a monetary union without fiscal union but strict adherence to the "no bail-out" rule. Calmfors (2015), for instance, questions whether a monetary union where bail-outs of governments are part of the system is viable in the long run without centralised fiscal decision-making. If more fiscal centralisation turns out infeasible, it might be better to restore a strict version of the no-bail-out clause and rely on markets to discipline fiscal policy. This would require a banking union that would be able to cope with the severe financial repercussions arising from allowing government bankruptcies.

Yet a credible return to the no-bail out rule seems unrealistic. De Haan et al. (2016) argue that eliminating all risk sharing within EMU is not feasible. In a highly financially integrated monetary

union, Member States are vulnerable to contagion and self-fulfilling liquidity crises. In such an environment, relying on market discipline only may cause debt restructuring to occur too soon and too much. This would unnecessarily increase risk premia, borrowing costs and reduce welfare.

As fiscal and political union appears to be out of reach in the near future, EMU is like a half-built house today. In the long run, this situation probably calls for a fundamental choice to move closer towards one of two extreme solutions outlined above. Yet, both alternatives will only become feasible after current vulnerabilities in the monetary union have been dealt with, in particular the high public debt overhang in many countries (De Haan et al., 2016). Likewise, reducing divergences in competitiveness and setting each individual country on the right trajectory for long-term growth appear to be a prerequisite to reduce legitimate fears of a permanent transfer union. Indeed, improving trust between European governments and electorates is a precondition to any step forward for a more solid and credible governance structure. Such stronger governance would, in turn, make EMU members and the whole EU more resilient against future shocks and more capable of reaching ambitious socio-ecological goals as laid down in the Europe 2020 strategy.

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KEY INFO

- The focus of Area 5 lies on the regional and local dimensions of a new European path to socio-ecological transition, including regional and local actors and policies. In examining the local dimension, a specific urban level that reflects cities as politicized spaces is discussed.
- The major contribution of Area 5 is represented by a collection of different case studies on four central themes that are highly relevant to sustainable developments in urban and regional contexts: i) governance of urban resource systems, ii) institutional aspects of regional labour market policy, iii) challenges of implementing integration policy at the regional level and the role of increasing ethnic diversity, as well as iv) rural aspects and the impact of agricultural policies.
- Concrete policy conclusions are derived from the empirical results of the case studies with a specific focus on place-based approaches and the development of self-organisation.

6. CHAPTER AREA 5: THE ROLE OF REGIONS IN THE EUROPEAN SOCIO-ECOLOGICAL TRANSITION

Thomas Sauer (EAH Jena), Peter Huber (WIFO)

6.1 Introduction

Area 5 focuses on the regional and local dimensions of the new European path to socio-ecological transition. The term socio-ecological transition concerns the shift of socio-ecological systems from one state to another. This implies that transitions are directed towards something like a new equilibrium, a new regime, or a certain benchmark like 'strong sustainability'. Area 5 concentrates on the local and regional level, as solutions to global problems like climate change are currently not very likely on a global scale. Local solutions to global problems are easier achieved and implemented on a small scale (WBGU, 2014: 44, 71). Since global challenges create individual effects on local levels, solutions are more efficient where they fit contextual settings. By 'local', this study refers to an urban level that reflects cities as politicised spaces. The range of the local level is varying for different aspects, policies, and social actions and can reach into the regional level as well, since cities are embedded in dependencies over their boundaries. The central assumption is that any strategy developed to enhance socio-ecological transition is unlikely to yield strong results unless the resources of regional and local actors are mobilised and the complex interactions between central policy initiatives and their regional or local implementation are taken into account. The commitment of local actors brings forth a sustainable governance of local resources. Local cooperation produces a wide variety of social innovations. These are adapted to the local context they concern (Mulgan et al., 2007; Phills et al., 2008; Franz et al., 2012; Mieg and Töpfer, 2013; *Reinstaller*, 2013).

A new development path for Europe therefore needs to be underpinned by regional, spatial, and local policies. It also requires the development of institutional arrangements beyond the simple market-government dichotomy to ensure human wellbeing and resilience of the ecological resource system. As evidenced by the repeated reference to the role of regional and local actors in contributing EU policy initiatives (e.g. the Lisbon agenda and the current EU 2020 strategies), this statement is uncontroversial both in the academic and the public debate. There is, however, a lack of research identifying the exact nature of the links between regional policy implementation and

national and regional institutions as well as institutional development. Thus, recent studies (Tapia et al., 2013) document the vast heterogeneity in terms of progress in socio-ecological transition in European regions. They come to the conclusion that differences in the quality of governance are an important factor in explaining this heterogeneity. These studies, however, remain unclear what 'good governance' for socio-ecological transition entails. This leaves policy makers rather unprepared in designing appropriate policies in this respect.

The aim of Area 5 was to augment the other parts of the project by conducting case studies on the implementation of socio-ecological transition in different regional contexts. Especially we sought answers to the following research questions:

1. How do EU-wide, national and regional policies currently influence the implementation and outcomes of the envisaged socio-ecological transition on the local and regional level?
2. What are the roles of the different tiers of governance in implementing transition policies and how are these roles assessed by local and regional actors?
3. What is the potential for activities beyond the classical market-government dichotomy (new institutions in terms of cooperatives, multi-stakeholder constructions, local regional partnerships and networks) to contribute to socio-ecological transition?
4. How do new institutions interact with the more traditional multi-level governance structures in the EU to shape transition policies?
5. How to improve the coherence of European socio-ecological transition policies, regarding the interactions of different governance levels, sectors, and spatial dimensions?

To highlight potential differences in the nature of these interactions across policy fields and to emphasise that socio-ecological transition entails the consideration of environmental and social policies, the research in this area focused on case studies related to policies. These concern the governance of resource systems (i.e. energy, green spaces and drinking water), regional labour market policies and integration policies related to managing ethnic diversity. Furthermore, it was also decided to augment these case studies by one on the regional impact of common agricultural policy.

Area 5 focused on four central themes that are highly relevant for sustainable developments in urban and regional contexts. They are more or less directly affected by different levels of policy-making, from the European Union down to national and regional institutions. However, the effects and implementations occur on the local level. The research covered the following topics in detail:

- Governance of urban resource systems (energy, green spaces and drinking water) was chosen on account of the importance of this policy field for the overall project as well as the important role that local actors have in determining the locations of work and leisure, habitat, landscape and infrastructure that are of primary importance in shaping ecological impacts of policy.
- Social and labour market policy was chosen because it has been argued that existing national institutions may either hamper or improve both regional labour market development and adjustments. In this context, the interaction of national institutions with regional preconditions and developments is of particular importance.

- Integration policies and the role of increasing ethnic diversity as well as the large regional differences in this indicate a regionally differentiated nature of corresponding challenges. The success in integration of foreign born people strongly depends on regional and local phenomena (for example the existence of networks or minorities).
- The impact of agricultural policies on rural and urban areas was chosen on account of the particularly strong effect of these sectoral policies (i.e. agricultural policies) on rural regions.

6.2 Background to the different case studies

Given the different nature of each of these policy fields and the different issues relevant, each of these case studies followed a slightly different methodology and theoretical approach as well. Research questions one, two and five were followed up by all case studies. Research questions three and four will be of particular interest in the case study of resource systems.

6.2.1 The governance of urban resource systems

The research focusing on the governance of urban resource systems aimed to shed light on how a socio-ecological transition towards sustainability is achieved in urban contexts (*Labaye and Sauer, 2013; Sauer et al., 2015A, 2015B*). The case study was focused on the conditions for the development of self-organised resource-governance institutions that are located in between the market-government dichotomy in the urban drinking water, green spaces and energy systems. "Self-organized resource-governance systems [...] may be special districts, private associations, or parts of a local government. These are nested in several levels of general purpose governments that also provide civil, equity, as well as criminal courts" (Ostrom, 2005: 283). Such resource-governance systems may be run by civil cooperatives in the energy and housing sectors, or by community groups caring for local green spaces, or non-governmental organisations intervening in the management of water or other ecological resource systems, or non-profit organisations managing urban farming initiatives.

In the "tragedy of the commons" (Hardin, 1968) we find a metaphor for the key problem of global sustainability: how to organise our economic activities in a way compliant with the future needs of the human community, i.e. respecting the planetary boundaries and the resilience of the ecological systems surrounding us. Solving such social dilemmas by choosing the appropriate institutional settings is obviously crucial for the sustainable governance of such common-pool resources. Following an approach indicated by Ostrom (1990, 2005), the case study sought for modes of self-organising the local common pool resources like energy, water, and green spaces. Self-organisation – for us – is the act of commonly organising and controlling a good, thus making it a common property (Fournier, 2013). Self-organisation is an alternative to governmental or market administration that relies on collaboration and an active public to make decisions on local levels, affecting varieties of stakeholders. Underlying is the assumption that self-organised and cooperative use of common pool resources is based on a complex set of variables and is induced by a change of norms guiding the governance of local resource systems. Consequently, sustainability transitions are

modelled as a sequence of norm changes and interactions with the socio-ecological resource system⁴⁰.

New institutional arrangements beyond the simple market–government dichotomy are needed to enhance human prosperity without overstressing earth's capacities to recover. Such a transition towards a regime of strong sustainability presupposes the transition of the economic system towards a higher degree of institutional diversity. This would enable experiments with new forms of economic governance, which could be independent of the ever-growing consumption of natural resources.

What is at stake here is the role of common-pool resources in the urban socio-ecological sustainability transition. We selected two natural resource systems and one hybrid resource system for our inquiry into the role of the third sector in this transition. Considering the urban energy systems, we assume that the decarbonisation of the energy system has significant spatial implications in urban areas through a decentralisation of the production of renewable energy. This could reunite the local production and consumption of electric power. This spatial recoupling of energy production and consumption on the local level could be a chance for an increase of self-organised non-profit activities. Green spaces appear to be a paradox in urban areas, as the degree of urbanisation is regularly measured in terms of population density. Green spaces are as well very scarce and conflict prone in urban areas. As a consequence the role and governance of green spaces in European cities play an important part in this transition due to increasing urbanisation and to the multiple functions urban green spaces provide. Nowadays we find a worldwide movement for urban agriculture, in more and less advanced countries all the like (Krasny, 2012; Barthel et al., 2013). At least since the European Citizen Initiative, claiming the 'right to water', drinking water could also be considered an urban common-pool resource (Ostrom et al., 1978; European Environment Agency, 2014; Parks, 2014). The rights on water are frequently closely connected with the property rights on land and soil and there are rapid and complex urbanisation processes in the most cases reliant on the public infrastructures for water provision.

For the research, a mix of quantitative and qualitative methods has been used⁴¹. This mix offers a glance at normative shifts, which lead to institutional changes in the sphere of common-pool resource governance. The research follows an abductive understanding rather than a deductive or inductive approach: this means that the research goal lies in confronting preset assumptions in the field with empirical evidence to create a picture of the empirical reality. These assumptions narrow down the research perspective and allow a focus on those elements that have the greatest influence. It focuses on the questions of whether, how and in which directions shared strategies, norms, and rules change over time, because norm-adopting behaviour is expected to be the main driver of transformative change. Specific institutional settings or frameworks might influence the

⁴⁰ A general model of socio-ecological transition has been developed in *Sauer et al.* (2015A, section 2.2).

⁴¹ A two-phase selection process produced a country selection with 14 countries (12 EU and 2 non-EU) and 40 cities. The sample covers a broad representation of over- and underperforming cities (concerning GDP growth) in the respective countries as well as shrinking to growing cities. In these cities, a quantitative inquiry was conducted as well as qualitative expert interviews with local actors from three distinct sectors (government, business, and civil society). The same sample of cities has been used to collect the data for the research on labour markets (section 6.2.2) and integration (section 6.2.3).

results of the success or failure of self-organisation and cooperation processes regarding the governance of the local socio-ecological resource systems. Thus, the research considers variables of demography and economy, geography and culture, government structure and local decision making autonomy, and welfare regimes (Sauer et al., 2015B: 9). Following a qualitative approach in social research, the main interest lies in a thorough understanding of socio-economic coherences in the field of urban resource organisation. Rather than explaining operationalised relations, the goal was to gain insight and differentiated opinions from local actors. Quantitative data complements the results to add more details.

6.2.2 Institutional aspects of regional labour market policy

The initial points of the study on regional labour market policies (*Huber*, 2013, 2014) were the wide regional unemployment rate disparities in the EU and the fact that previous studies have – depending on authors – emphasised two very different potential explanations. On the one hand, some analysts have blamed rigid national labour market institutions for impeding regional mobility and regional labour market flexibility in the EU. According to proponents of this view, this makes European labour markets sclerotic and incapable of adjusting to region specific shocks to labour demand, thus causing high and long lasting disparities in regional unemployment rates. On the other hand, a second view that has been forcefully argued in a number of publications of the OECD LEED programme sees regional unemployment problems as deeply rooted in the economic and institutional specifics of each country and region.

The proponents of these two views also come to rather different conclusions with respect to the adequate policy responses to regional unemployment rate disparities. For proponents of the first view, combating regional unemployment rate disparities requires (uniform) institutional labour market reforms at the national level to strengthen regional adjustment mechanisms to labour market disparities. Their typical policy recommendations therefore are a reduction of ancillary wage costs and a restructuring of European welfare states to increase self-responsibility and search incentives for the unemployed. For proponents of the second view tailor made region specific policies are needed that (because of lacking information of central policy makers on region specific problems) have to be designed by regional actors in a partnership-based approach to address the relevant issues.

Furthermore, European labour market policies are particularly interesting cases for studying the evolution of two relevant trends in EU governance. One trend is the increased devolution of formal competencies from central states to regional and local authorities, for example in the changing from active to activating welfare states (Hooghe and Marks, 2001; Rodriguez-Pose and Tijmstra, 2009; Lessenich; 2015; Schakel et al., 2015). The second trend is the increasing importance of policy networks in particular at the regional and local level (OECD, 2004). European labour market policy is mainly based on a soft (open) method of coordination due to lacking formal powers of the European Commission. With EU authorities having only little coercive powers to influence labour market policy directly, European initiatives in the field of labour market policies aimed at encouraging more region-based approaches to employment and labour market policy (López-Santana, 2006). At the same time this empowerment resulted in the creation of large and diverse networks conducting labour market policy that include national and regional social partner

organisations, NGOs, educational institutions, individual companies, as well as potential further actors as members or stakeholders (OECD, 2009).

The case study aims to investigate the general-purpose jurisdictions with system wide and durable architecture. These are non-intersecting in membership and organised in a limited number of levels. According to Hooghe and Marks (2010) they can be labelled as type I multi-level governance, such as public employment services (PES). In contrast, task specific jurisdictions have a rather flexible design and in principle can have intersecting memberships and no limits to the number of jurisdictional levels (type II multi-level governance). Examples are territorial employment pacts and/or local employment initiatives (Pact/LEIs) in regional labour market governance (Hooghe and Marks, 2010).

6.2.3 Implementing integration policy on a regional level

The case study on implementing integration policy on a regional level (*Dohse and Gold*, 2013, 2014A, 2014B) started from the observation that the European Union is undergoing a fundamental demographic transition. There is hardly another region in the world accommodating people with so many different cultures and attracting immigrants from all over the world. Accordingly, the number of individuals living in the EU outside their home country and ethnic diversity has increased significantly over the last decade. This has led to increasing social and political tensions (that occasionally have also been violent) based on xenophobic attitudes in a number of countries.

Following the literature on the issue, the assumption of this case study was that this increasing ethnic diversity comes at a cost. For instance by communication being made more complicated by language differences, and comparing diplomas and work certificates from different countries to assess job applicants' qualifications being labourious. However, ethnic diversity is linked to more diffuse transaction costs, if diverse groups mistrust each other, thus increasing the potential of social conflict. At the same time, there are benefits to gain from migration, both in monetary and non-monetary terms. The supply of goods and services is enriched, labour market demands can be better matched, and amenities increase. Moreover, ethnic diversity can be the breeding ground for creativity and innovation, which substantially affects the regional development perspectives.

Both costs and benefits increase in ethnic diversity. The concrete shape and position of a cost and benefit function depend on regional and national characteristics. Accordingly, local actors in cities can be expected to be particularly sensitive towards cultural ethnic diversity effects in their hometowns and are highly relevant actors for the success of integration policy. This case study takes stock of the local and regional level policies focusing on integration and on the interaction of different actors (urban administrations and migrant organisations) in this policy field. Local actor's expert knowledge on successful and unsuccessful integration measures was used and attitudes of regional actors towards ethnic diversity were assessed to do so.

6.2.4 The impact of agricultural policies

The last case study focused on rural areas and the impact of agricultural policies on these regions (*Camaioni et al.*, 2013, 2014; *Bonfiglio et al.*, 2014). Agricultural regions still play a major role within the EU. However, EU rural areas are going through greater challenges and major transformations, leading to an increasing heterogeneity of these regions. This applies to their main socio-economic

features as well as to their agricultural activities. The traditional urban-rural divide has become increasingly out-dated in recent years with, for example, central rural regions in continental countries sharply differing in terms of development from more peripheral rural areas. Furthermore, the distinctions are too sharp if only two categories are at hand. Accordingly, the research undertaken in this case study highlights the main dimensions affecting EU rural areas. It focuses on the spatial development of regions and the (re-)distribution effects of European Union funds, mainly in terms of the allocation of Common Agricultural Policy (CAP) expenditure throughout the EU27.

Based on a classification of the EU rural space developed for this purpose the allocation of EU expenditures is analysed in detail to assess to what extent the EU expenditures are a 'rural' and an 'agricultural' policy throughout the EU space. We consider the Common Agricultural Policy (CAP) because the CAP still represents the most important EU policy in terms of both total expenditure and share in the EU budget and because it includes a wide range of different measures, ranging from agricultural policies to rural interventions and environmental measures. In particular, while pillar one of the CAP mainly aims at supporting agricultural activities and farmers' income, the second pillar of the CAP refers to Rural Development Policy. Several measures are implemented to support competitiveness of agricultural holdings in rural regions, diversification of the economy in rural areas, and improvement of the quality of life within rural areas. In addition, some specific measures of Rural Development Policy more directly tackle environmental issues. From this perspective, it is possible to shed light on the territorial allocation of a variety of EU policies, especially when focusing on rural areas.

In addition to the analysis of past spatial allocation of CAP funds, we approach the evolutionary patterns of regional linkages and disparities across the EU space, especially those related to rural and peripheral/remote regions. The attention is concentrated on the distributive and redistributive GDP and employment effects of EU policies, in particular when targeted to these territories. The objective is to identify spatial relationships across the European space and the role of European policies in determining the evolution of regional disparities. To achieve this, we constructed and applied a multiregional Input-Output-Model at a NUTS-3 level, which represents an original attempt at this level of territorial disaggregation.

6.3 Empirical findings

Despite the obvious heterogeneity of the topics and approaches chosen by these case studies, a number of common findings emerged. There is a vast heterogeneity in the institutional preconditions for socio-ecological transition which is associated with different national institutional preconditions for policy making in different countries of the EU. In addition, these differences are closely associated with different preconditions in cities of different sizes. Thus, for instance the case study of regional labour market policies finds that cities of different sizes have very different degrees of budgetary autonomy for PES (Public Employment Services) organisations. In particular organisations active in labour market governance in smaller cities are more likely to have larger stakeholder networks and partnerships, involving in particular a larger number of regional actors and/or informal partners, irrespective of whether system wide hierarchical organisation such as PES or more informal organisation such as Pact/LEIs are considered. This also feeds into the assumption that these organisations have a substantially more diverse and a more flexible objective structure (in

terms of objectives, target groups and sector structure) and indicates a comparative advantage of regional labour market actors in small cities in implementing partnership based approaches to labour market policy making in the EU (*Huber, 2014*).

In part, these differences between cities of different sizes point to a different structure of problems in socio-ecological transition. For instance, the case study on immigrant integration and ethnic diversity suggests that incorporation of migrant organisations in urban governance systems is higher in cities where respondents state that problems resulting from ethnic diversity exist. This suggests that incorporation might partly be a response to perceived problems and part of the city administrations' conflict solution strategy (*Dohse and Gold, 2014A*).

Aside from city size, a second division line in the preconditions for regional policy-making can be drawn between different parts of Europe. This can probably be attributed to different historic governance experiences, different legal traditions, but also to different cultures of cooperation among actors in different parts of the EU. In particular, Eastern European countries seem to differ substantially from the rest of Europe. For instance, the case study on the organisation of urban resource systems in Europe finds that in general civil society actors play a significantly less important role in the management of urban resource systems than in other parts of Europe (*Sauer et al., 2015A*). The case study on labour market governance finds that PES organisations in Eastern Europe as a rule have higher managerial autonomy, but substantially lower programme design and budgetary autonomy. Eastern European Pacts/LEIs usually have smaller (formal and informal) partnerships. as Also they follow a more limited number of objectives and lower flexibility in their objective structure (*Huber, 2014*). The case study on integration policies finds that specifically Eastern European cities seem to set different priorities when assessing benefits, challenges, and chances linked to migration. As Eastern European regions tend to have comparably small shares of foreign population that is culturally rather close to the native population, for many Eastern European cities cultural differences seem to be more important with respect to ethnic minorities of the same nationality than with respect to foreign migrants. Furthermore, the case study suggests that the incorporation of migrant organisations and NGOs is particularly high in Northern and Central European cities, but lowest in Eastern Europe (*Dohse and Gold, 2014A*).

This points to the historic differences between Eastern European countries and the rest of Europe and reflects the generally lower level of social capital developed in many of the Central and Eastern European Countries found inter alia by Fidrmuc and Gërkhani (2008). It results in a lower participation of civil society actors in regional governance systems and a lower propensity to develop bottom-up institutions that are located between market and state governance. It also questions the rationale of 'one-size-fits-all' solutions of institutional development in a European context. In Northern, Southern and Western Europe – despite some remaining differences – centrally initiated policies aiming to support self-organisation development may find fertile soil due to ample experience with such forms of governance. In Eastern Europe, the issue seems to be the creation of preconditions for such policies. Furthermore, with respect to decentralised approaches to labour market policies, smaller cities (and by extension smaller regions) seem to have comparative advantages in developing decentralised policy approaches. This fact can potentially be traced to closer knit networks of social interactions.

6.3.1 Preconditions and limits for self-organisation

Heterogeneity applies to the pre-conditions for emergence of self-organised governance modes between market and government. In particular, the case study on the governance of urban resource systems shows that there are some differences in the preconditions for such self-organisation, with a central role for changing institutional arrangements lying in the degree of local autonomy, coherent legal frameworks, and activities of civil society.

The energy system is affected by the degree of local autonomy. In the process of a socio-ecological transition, the spatial attributes of the resource systems are changing as well. The complexity lies in the spatial recoupling of energy production and consumption. A shift in regional and national decision-making towards local decision-making autonomy is a necessary precondition for a variety of interviewed actors. It facilitates production, installation, maintenance, and handling of local energy (see section 6.2.1). This is seen as a main challenge for sustainable energies. Therefore, a central point to support socio-ecological transitions towards sustainability in the energy sector lies in empowering the local level. Actors from different cities stated that legal frameworks could make sustainability standards mandatory but allow the local level individual implementation. These frames and rules enable people and politics alike, rather than imply punitive measures which are assumed more productive by the interviewees. High levels of administrative centralisation interfere with the possibilities of such an approach and need to be considered in coherent legislations. In addition, several actors stated that the sole legislative power for sustainability issues should lie with the European Commission and thus relieve the national levels, especially concerning emissions and legal standards. This also affects national decision-making in energy questions – like in Germany or France – that has to be restructured accordingly. The overall framework needs to be open for participation and self-organising capabilities. While focussing on the European legislative level, the possibilities to enable local decision making autonomy can be backed by EU decrees. If institutionalised participatory processes are anchored in common political proceedings, the possibility to take control over issues in close vicinity is tangible (*Sauer et al.*, 2015A).

The green spaces sector is the most vivid example of an active civil society and attempts to introduce alternative institutional arrangements. The approach to self-organise local urban green spaces for a manifold use in recreational aspects, to increase biodiversity, or to produce food, is growing in several European cities. Reasons are the comparatively high degree of local autonomy in this field and the tangibility of the topic. Another reason is the close relationship this movement shares with a broader politically motivated movement about urban social problems. Younger generation perceive these issues addressed by this (heterogeneous) movement as especially urgent. The dynamics of social conflicts and conflicts evolving around political rights in taking part in decision processes that relate to urban spaces are considerable driving forces. However, this does not come without potential for conflicts. In general, the questions "how do we want to live?" and "in what kind of city do we want to live?" are deeply connected, and one major factor for civil activism. For the question about the role that new institutional arrangements can play, the insights are fruitful. The example of green spaces indicates that one chance lies in an emancipatory aspect of civil society to create an urban space compatible with diverse aspects of social and ecological sustainability. This view is tempting, since we assumed that any socio-ecological transition is a movement that concerns society as a whole (*Sauer et al.*, 2015A).

The urban water system shows distinct differences to the other systems. Nearly no cooperative forms of organisation have been found in our empirical research. This can be traced to the various features that influence the water system. It is sensitive to biological, technological, ecological, and economic aspects (costs for infrastructure are very high) and it is an indivisible natural monopoly-making decentralisation like in the energy system impossible. These make a participatory or self-organised approach difficult. Furthermore, to be organised, for example in a cooperative form, would require substantial understandings of the resource system – expert knowledge – usually being unavailable for civil society actors. This allows for instance new institutional arrangements with the aim to influence decision-making processes, to inform and raise awareness, or to set up frames for cooperation of all stakeholders. The common approach of urban water supply lies in city owned public utility providers that are socialised and assemble the necessary experts' knowledge. In this context, citizens' response to initiatives to privatise European water suppliers was overwhelming (*Sauer et al.*, 2015A: 138). Concerning infrastructure another factor becomes visible: Water systems are organised in long time spans. Concession rights easily last 70 years. While this factor also hinders the possibility to participate or to self-organise in the resource system, it provides a long-term planning horizon with adequate room for sustainability strategies. Where complex in-depth participation is nearly impossible, the integration of citizenry remains on a more representative level and concerns the local handling of the water suppliers. However, a critical awareness of the importance of the resource system is present and evolving (*Sauer et al.*, 2015A).

The research shows that the resource systems' suitability for self-organisation is differing. There are individual traits and differences in the several countries and cities as well as explicit convergences. However, a central role for changing institutional arrangements lies in the devolution of decision-making, coherent legal frameworks to facilitate and institutionalise this decision-making, and an active civil society. Where a socio-ecological transition heavily relies on expert knowledge and professionalism like in the water system, interventions of civil society are more difficult since they need a thorough understanding of the matter. Tangible topics with relatively low costs for entry and strong local context like green spaces management support citizen involvement and therefore a vital socio-ecological transition relying on self-organisation.

6.3.2 The role of national and EU level institutions

The answers to the second research question, the role of multi-level governance institutions, are evaluated differently. In contrast, their assessment relies on the policy fields and depends on their functions. Thus according to the results of the case study on the governance of urban resource systems the EU is perceived as an important external leader for water management, but not as the proper policy level for the energy system and green spaces. Possibly, the discussion about the privatisation of resources and resource use as well as the high dependence of many cities on EU funding in the drinking water systems' modernisation are relevant factors. Privatisation rates are very different in the resource systems; additionally hybrid forms exist, like *private public partnerships*. About 40% of the interviewed (local) energy providers are private or partially private companies. About 15% of the interviewees in the water questionnaire stated that water has been or will be privatised within the last or next ten years. In green spaces, the quantitative data does not

reveal a privatisation trend, whereas the qualitative data sheds light on examples of privatisation from several cities.

Furthermore, particularly in terms of urban resource systems, the evaluation of the roles of the EU and national policy makers differs substantially with respect to different roles it takes in policymaking. Thus, on quite a number of the interviews in any of the sectors the actors emphasise the important role of the EU in setting standards and highlight the importance of EU financed resources in times of severe budgetary constraints.

The case study on CAP, however, draws the attention to some of the drawbacks of the EU as a financier of regional policies. It finds that the intensity of CAP support shows major territorial imbalances across the EU27 space. In absolute terms, according to the intentions of the programme, central and urban regions on average receive a lower amount of total CAP subsidies than more rural and peripheral ones. This result is quite robust, as similar evidence is obtained distinguishing among distinct pillars of the CAP and measures from the overall CAP intervention. Nevertheless, when focusing on *ex-post* expenditures as well as indirect and induced effects of these policies on urban and central regions, these tend to profit more from CAP than that rural and peripheral ones. In this respect, CAP is substantially less "rural" than stated in its' political intentions: the less "rural" a region is, the larger is the expenditure intensity that is observed. These results indicate that the inter-sector and interregional linkages, which characterise the EU, redirect a large part of the policy's positive effects from rural regions and the primary and secondary sector to urban regions and the tertiary sector (*Bonfiglio et al., 2014*).

The empirical results of the case study on regional labour market governance, by contrast, finds that (uniform) national institutional reforms are unlikely to be helpful in reducing regional unemployment rate disparities in the EU. Among 16 indicators measuring national labour market institutions (for wage bargaining institutions and trade union organisation, labour and product market regulation, the generosity of minimum wages and national social security systems as well as on active labour market policies) only 2 (net replacement rates and the generosity of health benefits) are robustly positively correlated to unemployment rate disparities within OECD countries. By contrast, other institutions seem to work in the direction of increasing regional inequality rather than decreasing it. Countries with higher centralisation of wage bargaining, more generous minimum wages and more generous old age benefits as well as higher effective tax rates of moving from unemployment to employment robustly have lower regional unemployment rate disparities than countries with lower centralisation of wage bargaining, less generous minimum wages and old age benefits or lower effective tax rates of moving from unemployment to employment. More centralised wage bargaining systems, but also more generous minimum wages and old age benefit systems (probably through making early retirement in depressed regions more attractive) and higher tax progressivity (as a proxy for welfare state development in a country) therefore seem to reduce regional unemployment rate disparities rather than increasing them. Only (uniform) national reforms of the health and unemployment insurance systems appear to have a positive impact on the search incentives of the unemployed (*Huber, 2013; Horvath and Huber, 2013*).

At the same time, these results suggest an important role for explanations based on regional productivity differences and differences in natural and human made amenities between regions. Countries with higher disparities in regional productivity levels as well as with higher disparities in

terms of cultural, recreational, and natural amenities robustly have higher regional unemployment rate disparities irrespective of the measure of regional disparities considered and of the method used to test for their impact on regional disparities. Region specific factors therefore seem to be more important determinants of regional unemployment rate disparities. This supports the case for more place based policies to combat regional unemployment rate disparities and questions the efficacy of institutional reforms in reducing regional labour market disparities (*Huber, 2013; Horvath and Huber, 2013*).

These results are reflected in the research in the labour market policy case study. The interviews conducted among regional public employment services (PES) as well as among more "bottom-up" organisations in regional labour market policies (such as territorial employment pacts and local employment initiatives) in this case study indicate a high discontent of regional labour market policy actors with central government and EU-wide support for such labour market policies. In particular, these actors consider the targets set by national and EU actors as well as the general distribution of competencies as rather unhelpful in conducting effective regional labour market policies (*Huber, 2014*).

In sum, the case studies suggest that the perceptions of the role of the EU and national governments by regional actors depends very strongly on a) the policy field considered and b) the concrete function of the higher tier level governance structure considered. On a very general level, this therefore suggests that reforms of the multi-level governance systems of the EU will have to take a case-by-case approach, which considers both sector as well as functional criteria.

6.3.3 The benefits of local initiatives and cases for place based policies

Despite this heterogeneity, regional actors' perceptions of the potential for local initiatives are predominantly positive and cooperation between actors in different policies is perceived to have contributed to developing a common view on some of the issues related to the policy fields.

For instance, in both the questionnaire and the topic guide for the interviews of the case study on the governance of urban resource systems, the interviewed experts were asked to give a brief definition of the term 'sustainability', to allow the assessment of the degree to which a common understanding of socio-ecological transition has been reached. The issues mentioned by these experts cover the set out sustainability goals, defined by the European Union (Council of the European Union, 2006; Eurostat, 2009, 2011, 2013) and can be divided into three aspects: social, environmental, and economic sets of goals. Generally, however, social aspects of sustainability like migration or demographic changes are considered less important than resource issues. The interviewees commonly name these "three pillars" as a framing for sustainability definitions and evaluate them as a standard approach, considered as "conservative perspective" or "solid knowledge of university's curricula". Furthermore, interviewees occasionally referred to an additional fourth pillar that relates to the significance of governance, institutional or governmental aspects for sustainability. Thus, the broad reference of the three-pillar-model indicates that to a certain degree the definitions of sustainability are common knowledge and suggest a convergence to the EU sustainability goals. They are not considered equally relevant (*Sauer et al., 2015A*).

The empirical results of *Dohse and Gold* (2014A) suggest that the benefits of ethnic diversity (measured by the Herfindahl index or the Theil index over various sending country groups of

migrants) are often related to innovation increasing effects and do exceed its costs, on average. However, at very low levels of ethnic diversity there is not much to gain, such that ethnic diversity only starts to pay off from a certain level on. Furthermore, these results also hint at nonlinearities in both the costs and benefits of ethnic diversity. There may be an optimal degree of diversity in an economy which maximises its net benefits. The location of this optimum will depend on whether the benefits of migration are realised in a regional context or not. This is influenced by the success of integration policies. Because of the fact that integration always takes place in a specific regional context, these have a clear regional policy dimension. Most obviously, urban areas are centres of cultural ethnic diversity. Traditionally, cities are home to diverse people and cultivate a self-conception of openness and tolerance. Consequently, many migrants move to urban instead of peripheral regions and thus contribute to the multi-cultural 'flair' of cities. They are affected by the costs of ethnic diversity. Most prominently, these can be observed when it comes to ghettoisation, i.e. when different cultures concentrate in different neighbourhoods. In the worst case, ghettoisation imposes barriers to cooperation and thus transaction costs, when cultural groups stop interacting and develop animosities, which exaggerate social conflict. This might outweigh the benefits from cultural ethnic diversity and present an obstacle to the economic development of cities. Furthermore, regional actors to some degree can influence the costs and benefits of ethnic diversity; for instance by increasing or ameliorating the inter-ethnic conflicts in a region.

Local actors have surprisingly positive views on the effects of diversity on their region. The respondents emphasise the positive supply effects of increasing cultural diversity relating to the quantity, the quality, and variety of goods and services provided. Moreover, local actors identify the inflow of skills and ideas, the increase of the cities' innovative capacities, the increase in new firm formation and consequently the increase in city dynamics as major benefits of cultural diversity. The actors also mostly provide a credible and differentiated evaluation of the condition and perspectives of cultural diversity in their city. In particular, both groups mostly see cooperation between migrant organisations and the city administration positively, although the assessment by the migrant organisations is slightly more critical than that of the city administrations. This might partly be due to the relatively high level of incorporation of migrant organisations into administrative routines with respect to migration by the cities.

This suggests that incorporation of a large variety of actors can contribute to developing a common understanding of important policy issues and to the development of shared strategies to overcome potential regional policy problems and thus supports the case for place based policies. This is supported by the results of the case study on agricultural policies as well. It suggests that, if CAP funds were concentrated in pillar 2 support (i.e. in place based policies⁴² for policies focusing on regional development strategies in rural regions), this would minimise the unintended spillover effects to urban regions. The interviews conducted in the case study on the governance of urban resource systems point in a similar direction. In these, actors uniformly stress the importance of awareness building and cooperation at the local level as an important impact on regional policy. In

⁴² Place based policies are policies that take specific account of the specific situation in and resources of a region and are usually designed and implemented by regional authorities.

particular, in the fields of green spaces and energy, frequently NGOs and non-public actors are seen as the key actors.

Many diverse actors play important roles in the energy and the green spaces systems. These include the mayor and politicians of the majority, government administration, and environmental NGOs. In the energy system, universities and the utility provider take an important position too. In contrast, just the two main actors water provider and government administration were mentioned in the water system case, whereas other potential actors play minor roles. Despite being the system with the largest number of stakeholders, only minor difficulties can be observed for the actors in defining a joint strategy in green spaces and energy system management (*Sauer et al.*, 2015A: 142-143).

Interaction in policy networks is not always conflict free. For instance the reduction of green spaces due to infrastructure and building development, often linked to privatisation, has generated conflicts between urban stakeholders with diverging interests and a different understanding of the value of green space in a number of cities. While this often leads to diametrical visions for city development, conflicts are part of the problem solving process, if stakeholders dispose of institutionalised conflict resolution tools. Such tools, however, seem to be widely missing, since only a minority of actors consider conflicts as a constructive component of the sustainability discourse, driving forward the socio-ecological transition.

Finally, the case study focusing on labour market points to an important role of the cooperation of local authorities' organisations as well. In particular, organisations involved in labour market governance (irrespective of whether these are local employment initiatives or regional PES organisations) consider data availability for monitoring and evaluation and the possibility to cooperate with all kinds of regional actors as the most important factors facilitating the design of effective regional labour market policies.

6.3.4 Limits of place based policies and challenges to regional institutions

Regional actors are aware of the limits to place based cooperative policies. For one these arise in cases where the regional level does not have the relevant information to implement such policies. Thus, in the case study on the governance of urban resource systems a number of actors clearly state that they lack the information to assess the situation of the respective resource system. In the labour market case study the importance of developing regional information and evaluation systems for regional labour market policy as well as the emphasis of the value added of cooperation with various local actors suggest that lack of information on the local economy is a major impediment to the development of effective region based approaches to labour market policy.

Such limits arise in cases where the regional level simply does not have sufficient resources or legal powers to conduct place-based policies. In this respect, the economic and financial crisis since 2008 seems to have substantially impeded on the feasibility of place-based approaches especially in fields where major investments are necessary. Thus, in particular in the case study on urban resource systems, the interviewed experts repeatedly stress the strained financial situation of many urban administrations that prevents the improvement of public infrastructure.

Finally, situations with spillover effects to other regions are unsuited to both the development of local initiatives and place-based policies. For instance, in the case study on the governance of urban resource systems, respondents repeatedly refer to the fact that in the management of water and energy systems, major parts of the resource system are not under regional control. How far local decision-making matters in socio-ecological transition processes, depends on the resource system observed. In green spaces, the local level is perceived as best suited for governing the resource system. For the urban water system, it is the local as well as the subnational level, additionally the EU is perceived as an important external leader. The national regulatory framework is very important for the development of renewable energies in the region. This sometimes precludes developing regional strategies. Particularly, the involvement of other (neighbouring) regional governance systems still seems to be in its infancy in most European regions. This is documented by the case study on regional labour market governance where it was found that only a very small part of both the PES and Pact/LEI organisations involve actors from regions outside their own region.

6.4 Summary and Policy Conclusions

In sum, the Research Area 5 "The Role of Regions in the European Socio-Ecological Transition" of the WWWforEurope project provided detailed insights into the regional aspects of the social, economic, and ecological aspects of sustainability transition in Europe. The assumption that any socio-ecological transition can only achieve positive results, if actors from all levels are involved, is backed by empirical results. This implies any transition needs to involve local actors in European regions, as well as respective administrative levels, up to national or European ones, to be successful. Thus, the question has been raised, whether more place-based policies that are decided upon and implemented in local contexts are an adequate solution for sustainable socio-ecological transition politics.

As a first indicator, the role of cities – as spatial, socio-economic and political relations – for a socio-ecological transition emphasises that especially urban areas can be a driving context behind transitions. Cities are important, since they accommodate nearly half of the EU's population and are an essential place for economic and social activities. The research shows that sustainability issues need to be rooted in local levels to ensure the wellbeing of the city along with the most efficient way to arrange local resources, actors, tools, and strategies with policies. We found that there is a role for a civil society beyond government and market structures for setting-up self-organised and participatory approaches to transition in crucial resource systems like green spaces and energy, and to a lesser extent as well in the local water provision. Therefore, certain degrees of decentralisation and autonomy, especially in decision-making and in financial means, are necessary to support a transition.

A social dimension of a transition towards sustainability can be seen in institutional aspects of regional labour markets. Disparities within the European Union are very high; the structural aspects for unemployment for example are very heterogeneous. The research results indicate that national labour market institutions only partially explain differences in regional labour market disparities across countries. Above that, the division of powers between different levels of government need to be reformed to ensure efficient place based regional labour market policies. Enabling a more locally

organised decision-making process on labour markets can be a potent policy to cope with heterogeneous labour market disparities.

Integration policies on regional levels show that there is a growing cultural diversity due to an increase of migration movements within the EU and into the EU. The research in this field shows that there is a positive correlation between economic success of a region and its cultural diversity. In addition, the degree of diversity relates positively to innovations and indicates that migration and – above that – cultural diversity indeed cause positive effects for regional development. Migration and integration policies positively affect innovation and economic performance and maintain respective policies in these fields.

Concerning rural areas, the results suggest that the Commission should reconsider the design and implementation of agricultural policies. The key issue of regional disparities' reduction has to be tackled by stressing the importance of promoting regional development policies across the EU with a specific focus on rural and remote areas. It should thus be derived from place based rather than sectoral policies, as the results of the case study on CAP stresses the importance of those territorially targeted measures directly aimed at promoting local development throughout EU rural and remote regions. In particular, in designing such policies single national approaches to rural and peripheral areas should be supported by broader EU approaches, which are able to encompass different territorial levels.

A comparison of alternative scenarios regarding the next programming period (2014 to 2020) shows that the criteria of regional distribution of funds allocated to basic payments to be adopted at a national level are not going to significantly affect the stimulated final effects of the policy. This means that the criteria of regional distribution that will be adopted at a national level are not going to affect the policy's effects. Rather, our results suggest that the transfer of all CAP funds to the second pillar (the rural development policy) would be the most efficient way to reduce disparities between rural and urban regions among a number of scenarios constructed.

6.4.1 Place-based policy approaches in local labour markets and integration policy

According to the results of the case studies on labour market and diversity, there is substantial room for increasing place based approaches to economic policies. In particular place based labour market policies should encompass the provision of information on local labour market conditions, matching of workers to vacancies, training of workers and subsidies to firms and job creation schemes targeted to specific sectors. These aspects are easier supported and fostered with place-based policies than place-blind policies.

Implementing such an approach, however, is not without challenges. It will require embedding regional labour market policies in a coherent multi-level governance framework, which provides regional policy makers with sufficient flexibility, while at the same time supporting them in developing the resources and capabilities to conduct such policies and ensuring continued evaluation. In particular, the most efficient measures to foster such effective place based regional labour market approaches in the EU would consist of:

1. Increasing budgetary autonomy of the regional level of labour market policy institutions and providing them with the necessary tools and powers for their tasks.

2. Developing of broad based partnerships involving a multitude of stakeholders to manage labour market governance issues at the local level.
3. Providing additional information in terms of evaluation and monitoring results with respect to policy measures and the regional labour market situation.

Finally, there is also a need of horizontal coordination of regional labour market policies. This applies both to coordination within a territory and across territories. Thus with respect to horizontal coordination within territories both the Pacts/LEIs as well as the PES-organisations interviewed in our regions follow rather similar policies. If one of the institutions follows a particular strategy, the probability increases that the other institution in the same region follows this strategy as well. At the same time, when for one of the institutions the importance of a particular strategy increases, the other one faces a higher probability of increasing importance of this strategy. Thus the close relationship of Pacts/LEIs and PES organisations often leads to these organisations focusing on rather similar objectives. Care therefore needs to be taken to guarantee a benefit of Pacts/LEIs (for example in terms of the use of other instruments) relative to PES organisations.

Similarly, the case study on integration policies suggests that the design and particularly the implementation of integration policies should take the regional heterogeneity into account. When it comes to cultural diversity and to its economic and social impacts, the regional dimension is much more important than the national one. Policy measures, designed to integrate migrants into broader communities, are more successful, if they have a strong regional component: First, because the host community itself is defined regionally, and secondly, because it can take the specific needs of the respective region into account. For example, if a region has a comparative advantage in producing high-end products and services, it benefits from other types of factor inflows than a region specialised in producing intermediates. Moreover, if the regional foreign population consists of many individuals from different cultures, this asks for different policies than those that foster integration in regions where the foreign population consists of rather few cultural groups.

Thus, regional actors, i.e. regional administrations but civil actors as well should be incorporated into the design of integration policy. Specifically, they should have the freedom and the funds to adjust policies to the regional needs. Our results suggest that local autonomy on the regional level can help reducing the transaction costs of cultural diversity while keeping intact and possibly even increasing its innovation benefits.

More generally, when linking immigration to integration policy, it is important to consider that not only the share of foreigners living in a region has an effect on economic outcomes, but the composition of the foreign population as well. Therefore, it is not just about tackling labour market imperfections by migration of any individuals – the cultural diversity induced by migration may have additional benefits. Better linking these strands of policy and better integrating local actors into its design and implementation will help European regions to advance on a sustainable development path towards welfare, wealth, and work.

6.4.2 Development of self-organisation

In the discussion of the findings of the current research, it emerges that there is a growing lack of trust in government. In many countries, democratic engagement and citizenship are shrinking. At

the same time, transition processes are taking place in many urban systems and opportunities are visible in new social movements, new technologies, other civil society groups, and networks. Particularly, cities and networks of cities play an important role in this process, as well as bottom-up initiatives that emerge from citizenry in response to the urgent transition needs.

Table 7 Findings and recommended options

Issue	Area	Stepping Stone
Tangibility of resource systems and influences on it	All	A common understanding of sustainability is required to allow a collective undertaking towards set-out goals in congruent time frames.
Complex constitution of the resource system	Participation, self-organisation, politics	A holistic approach is necessary and, with it, transparent information as well as education. Open access to transparent information is a basis for involvement.
Individual responsibility for transition	Politics, education, participation, self-organisation	Seeing SET as individual responsibility negates its complexity. Communal solutions must be collective efforts. Local cooperation strengthens mutual and individual benefits.
Lack of education, awareness, and understanding, as well as lack of trust	Cooperation, communication	Complex processes are hard to grasp. To create an understanding of SET, education is important. It is not an expert topic and concerns everybody. Everybody should be able to comprehend the basic concepts. Cooperation produces mutual trust and reputation for further developments in the long term.
Spatial limitation for socio-ecological transition	Planning, self-organisation	Urban areas cannot be decoupled from close rural areas. Production (and thus labour) need to be in the vicinity and still decentralised. In addition, production and consumption need to be efficient enough to optimise the ratio of production to spatial size.
Coherent legal frameworks for a maximum of local autonomy and bottom-up governance	Governance, politics, laws	To enforce a SET to sustainability, a binding overarching legal framework is necessary that guarantees decision-making processes at the local level. National political decisions and laws cannot interfere with local-level politics. Rather, governance must be thought 'bottom-up'.
Sustainable socio-ecological transition needs an active public sphere	Participation, self-organisation, public discourse	Transitions cannot be enacted; they need a broad coalition, involving all affected actors. These actors need to be empowered to act as transition players.
Social cohesion	Politics	To prevent the effects of gentrification and rising living costs due to sustainability processes, a coherent social policy is needed. Labour markets are one pillar of it.

Source: own illustration.

Varieties of connective processes acting on different scales are fundamental attributes for cities. A concerted strategy is needed to make things possible. This strategy ensures institutional rules in favour of local sustainability by enabling access to technologies that affect cities' operating space. It stimulates community-led bottom-up approaches, including a self-organising community of interest

among residents, landowners, infrastructure companies, businesses, social enterprises, NGOs, and community organisations. This allows governments to act in pursuit of change.

In the course of finding new institutional settings with which to govern local urban common pool resources, different actors are equally important. The interaction and negotiation between government, business actors, and civil society is vital to providing a healthy socio-economic transition for the profit of all.

This new perspective of collective changing and (re-)aligning institutional settings shows that transitions, rather than being managed, can be influenced, supported, and accelerated by local self-organisation. By allowing openness, exchange, stimulation of differences and contradictory conditions to occur at the same time, local urban actors can play an important part in these dynamics. Their insight and knowledge of their own local urban features allows for a thorough assessment and promotion of socio-ecological transitions. According to the socio-ecological transition approach developed here, a sequence of norm-adaption should be considered as steps towards strong sustainability. Table 7 sums up the main findings of our research on self-organisation capabilities. The issues presented pertain to different areas of possible action like politics or self-organisation. Stepping-stones to commence with actions to change rules and norms and encourage a transition process to stronger sustainability are listed in the third column.

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