

In January 2012 the Green Growth Knowledge Platform (GGKP), a joint initiative of the Global Green Growth Institute (GGGI), Organisation for Economic Co-operation and Development (OECD), United Nations Environment Programme (UNEP), and World Bank, was officially launched in Mexico City. GGKP's constituent organizations, together with leading scholars, development practitioners, and policy makers from around the world, examined the most pressing knowledge gaps for green growth and discussed the Platform's programmatic priorities.

The capstone event in Mexico was GGKP's inaugural conference, "Green Growth: Addressing the Knowledge Gaps."¹ More than 150 participants wrestled with the state of green growth knowledge across seven themes: innovation, trade, natural resource management, infrastructure and urban development, employment, ecosystem resilience, human behavior, and welfare measurement. Their ideas, coupled with inputs from GGKP's Advisory Committee, comprised of leading academics and policy makers in the field of green growth, helped shape the Platform's initial work program.

In light of the key knowledge gaps identified, the GGKP is exploring new work streams for three issues related to green growth. These work streams will leverage the vast array of green growth work being done by the Platform's partners, including GGKP's first Affiliated Programs, the European Climate Foundation's initiative on "Green Growth Best Practices" and the World Bank's effort to develop better tools for "decision-making under uncertainty." These research programs, and the associated knowledge-sharing activities to be facilitated by the GGKP, will operate with an understanding that the green growth and green economy policy mix will vary according to country-specific circumstances, thereby necessitating a menu of policy options and toolkits. The first three work streams will be:

1. Technology and innovation
2. Trade and competitiveness
3. Welfare measurement and performance indicators

Technology and innovation

Consensus emerged at the conference on the importance of technology to reconciling "green" and "growth." This work stream will focus on the role of technological change in green growth, emphasizing exploration of the relationship between technological and behavioral change; methods to foster green creativity and entrepreneurship; channels for South-South knowledge sharing; key barriers to the diffusion and adaptation of green technologies in developing countries; and policy instruments to promote green innovation and technology diffusion.

Trade and competitiveness

An enduring concern for both developed and developing countries is the extent of trade-off between environmental policy and international competitiveness, at both the national and firm level. This work stream will focus on the relationship between green growth policy and competitiveness, examining the impacts of green growth policies on the patterns and volume of trade, as well as on national and firm competitiveness; the legitimacy of the "pollution havens" hypothesis in developing countries; the risk of trade disputes arising from green growth policies; and methods for realizing the comparative advantage provided by natural capital endowments

¹ All conference documents are available at www.greengrowthknowledge.org/pages/events/asp.

while avoiding reliance and excessive exploitation. The work stream may prioritize gathering missing data essential to addressing these questions, such as information on country- and industry-specific environmental policies and on carbon intensity and pollution abatement costs at the sector and firm levels.

Welfare measurement and green growth indicators

Efforts in this realm will concentrate on developing a common framework for green growth/green economy indicators and metrics under the GGKP banner, aiming at a set of headline metrics that are informative, measurable, relevant across levels of development, and easy to communicate. OECD, UNEP, and the World Bank are very active in this space, so GGKP will convene a group of experts from the three institutions that will promote harmonization of their work. In this context, additional behavioral economics research may shed light on the public acceptability of various indicators.

A number of other topics piqued considerable interest and may form the basis for future GGKP knowledge programs, including both green jobs and the centrality of consumer and firm behavior to the greening of growth.

Finally, the GGKP Council also decided to move forward on a variety of efforts to institutionalize the Platform², including:

- Establishment of a formalized Secretariat, jointly hosted by GGGI and UNEP, to support the operations of the GGKP;
- Development of an informative and interactive online platform at GGKP.org;
- Development of additional partnerships with organizations interested in contributing to the GGKP's operational, research, and/or knowledge-sharing activities.

What follows are summary notes from each session at GGKP's inaugural conference.

² The establishment of the Green Growth Knowledge Platform was codified with the signing of a Memorandum of Understanding between GGGI, OECD, UNEP, and the World Bank on January 11, 2012. The MoU describes a Council consisting of representatives from each signatory institution.

Framing the Debate

Moderator

Mr. Soogil Young, Presidential Committee on Green Growth, Rep. Of Korea

Presentations

Mr. Geoffrey Heal, Columbia University

Messrs. Sjak Smulders and Cees Withagen, Tilburg University

Summary

Green Growth is being discussed increasingly by practitioners and policy-makers, but has not as yet undergone the necessary rigorous analysis from economists. It is essential that we now focus on building a solid framework to define and assess Green Growth with economists looking at it with hard-nosed analysis and bringing it into the core economic debate.

In investigating Green Growth, we need to follow an analytical framework with an overall view to; (1) assess what needs to happen over the next 5-10 years to avoid lock-in to patterns that are prohibitively expensive and complex to modify and; (2) reconcile the short and long term, by offsetting short term costs and maximizing synergies and economic co-benefits. Such a framework can provide a solid basis for identifying socially and politically acceptable channels through which green policies can contribute to economic growth.

A review of dynamic general equilibrium models can offer insights on the interaction between economic growth and environmental issues. The Ramsey Framework for example offers an extremely useful tool for studying growth and welfare and can be extended for natural resource inputs and pollution as well as for endogenous technical change. This review suggests that it is unlikely that long-term growth is significantly affected by green policies. The challenge is how to avoid affecting growth in the medium-term while dealing with the additional challenges that come with distributional issues and political economy obstacles to policy reform.

Since green growth policies pursue a variety of goals, they are best served by a combination of instruments: price-based policies are important but are only one component in a policy tool-box that can also include norms and regulations, public production and direct investment, information creation and dissemination, education and moral suasion, or industrial and innovation policies.

While much of the debate thus far has been focused on incremental measures we must not lose sight of the drastic measures required in order to remain within the 2 degree Celsius limit. This will not work if only a few countries are moving in this direction; international collaboration is essential.

Welfare Measurement and Performance Metrics

Moderator

Mr. Danny Leipziger, George Washington University

Presentations

Mr. Kirk Hamilton, The World Bank

Mr. Paul Schreyer, OECD

Mr. Paul Ekins, University College London

Mr. Fulai Sheng, UNEP

Summary

A number of countries, both OECD and non-OECD, have adopted green accounting, taking account of natural capital depletion in measuring growth. There are however, methodological and technical challenges facing the implementation of green accounts. Valuing natural capital is particularly fraught with challenges and we do not as yet have sufficient data and models to provide accurate valuing of biodiversity, substitution possibilities, ecosystem services or confirmation of positive net savings as evidence of sustainability.

OECD's Green Growth measurement agenda elaborates a measurement framework and a preliminary set of indicators (to complement GDP) related to 1) environmental and resource productivity, representing the volume of output per unit of services from natural assets; 2) the natural asset base; 3) environmental quality of life; and 4) economic opportunities through, for example, innovation, investment and competition.

The effectiveness of these indicators however is largely dependent upon the resolution of measurement agenda issues. The System of Environmental and Economic Accounting framework (SEEA) has already been adopted, and we must now make progress on implementation as key for consistency of information and construction of indicators. We must also make progress on measures for key natural assets in particular regarding land and land use changes and non-energy mineral resources, improved demand-based estimates of environmental productivity/decoupling, extended traditional growth accounting to include natural assets, thereby deriving new measure of multi-factor productivity growth and advanced physical measures in particular on biodiversity and nitrogen / phosphorus balances (beyond agriculture).

Key questions remain as to the scope of green economy / green growth indicators. While some see it as essential that measurement should capture all relevant important indicators (e.g social, health etc), others argue that social indicators should be measured through the social-economic nexus without being included in green economy/ green growth measurement.

UNEP outlines three sets of green economy "outcome" indicators; Economic, Environmental and Social. Economic indicators should measure changes to GDP, including the value added of Environmental Goods and Services (EGS) such as creation of green jobs, effects on the general price level, effects on fiscal balance and effects on balance of payments. Environmental indicators should measure changes to aggregates such as carbon emissions, particular matters, ecological footprint as a result of green economy policy interventions across sectors and sector specific indicators such as stocks of natural resources. Aggregate social indicators such as the level of educational and health services could be relevant measures if social policy interventions

are considered and included as part of the green economy policy interventions – otherwise these can be measured under the effort to measure welfare generally. The remaining social indicators connected with green economy policy interventions may include poor people’s access to critical resources including clean/ renewable energy, water and sanitation, food security, reduced health risk, decent work conditions in affected sectors – all with gender differentiation as appropriate and feasible.

In order to make progress on this and further the development of welfare measurement and performance metrics, the following key research areas were identified at the conference:

- How can we best diversify from GDP and communicate alternative, expanded models?
- Need for a better handle of measures of wealth (valuation of assets and the need to determine better discount rates. How far should we go in measuring natural assets?)
- The impact of green growth policies on growth, e.g. how should we evaluate environmental regulations, compare regulations across countries and set the index?
- Consider whether we are missing sources of growth by neglecting the relationship between natural capital and productivity gains.

Infrastructure and Urban Development

Moderator

Mr. Raouf Dabbas, Ministry of Environment, Jordan

Presentations

Mr. Andreas Schäfer, University of Cambridge and Stanford University

Mr. Joaquim Oliveira Martins, OECD

Mr. Heekyung Park, Korea Advanced Institute of Science and Technology

Mr. Andrés Flores, National Institute of Ecology, Mexico

Mr. Ernst von Weizsäcker, International Resources Panel

Summary

Looking at transportation, it is clear that while vital to economic and social development, transportation also generates undesired consequences on both local and global scales. These often can be shown to follow an “Environmental Kuznets Curve” whereby negative impacts (including for example traffic accidents, air pollution) rise before peaking and then continuing to decline. However there are other global transportation impacts which do not as yet follow this curve, namely the global impact of transportation on climate change. Drastic reductions in GHG emissions will increasingly need to come from reforms in the transport sector.

Greening transportation requires a combination of significant technological and behavioural changes. The aim should be to provide similar levels of accessibility and quality of transportation services while depending on a lesser amount of transportation activities and on a higher share of less energy-intensive modes. Policy measures to achieve this need to be carefully developed with a combination of measures – including marginal social cost pricing, infrastructure and land-use planning, and enhanced use of telecommunication substitutes – being most effective. Further research is evidently needed on these policy combinations and the potential to change the fundamental dynamics underlying the development of transportation systems. Developing countries have a unique opportunity to leapfrog many of the undesired transportation externalities and move toward a cleaner transport infrastructure without giving up on accessibility to information, goods and services.

Opportunities for inducing behavioural change could include: 1) charging travellers the total marginal societal costs of transportation, 2) more balances investments into non-road based infrastructures and 3) and alteration of consumer lifestyles such as changes in vacation destination or the partial substitutions of telecommunication means for physical travel.

Lessons shared from South Korea’s green urban regeneration projects provide suggestions for further research and increase operational efficiency of green growth urban development projects in other countries. The example of Seoul’s CheongGye Stream redevelopment project in particular highlights the importance of establishing the necessary legal, institutional, technological and social means to facilitate green infrastructure project in small and medium cities in particular. Korea has, as a consequence established the Korea Urban Renaissance Center (KURC) which focuses on four main tools or functions: 1) National comprehensive strategy for regeneration 2) Community development to regenerate urban areas environmentally, economically and socially 3) Three-dimensional mixed –space development: Developing methods to make the urban areas more efficiency, compact and complex places 4) Urban infrastructure

Regeneration: Developing techniques and systems for more efficient, eco-friendly and sustainable urban infrastructure.

Technologies relevant for infrastructure are mainly on the demand side and include superefficient cars, electric cars fuelled by wind power, “pedelecs” for city transport, passive houses (factor of 10 more heat efficient), LED replacing incandescent bulbs, shift from Portland cement to geopolymers and infrastructure challenges including water recycling, city structure, train infrastructures, telecommunications / teleconferences etc. In order to stimulate the development of these technologies a strong price signal is key. It is argued that we should ‘let prices steer the direction and let engineers and investors do the details’. We need a political decision to artificially raise energy prices while simultaneously increasing efficiency so that average expenses for energy services remain stable. Using the example of Japan, we can see that high energy prices need not hurt the economy – the Japanese economy blossomed during the 15 years of highest energy prices.

The following key areas were identified from the discussions as crucial for further analysis:

- Failures on coordination and multi-level governance;
- Green Growth modelling at the city-level, need for micro-economic models (including supply chains); and
- The need for comparable indicators and time series, especially to account for degradation.

Trade

Moderator

Ms. Ann Harrison, University of Pennsylvania

Presentations

Mr. Larry Karp, University of California-Berkeley

Mr. Jaime de Melo, University of Geneva

Mr. Brian Copeland, University of British Columbia

Mr. Ron Steenblik, OECD

Summary

One of the key issues around the pursuit of green economy / green growth policies, in particular from the perspective of newly industrializing countries, is whether growth in a competitive world economy is dampened by effective environmental policy.

Existing research indicates that there is either no or a short run trade-off between international competitiveness and environmental policy. Taking the examples of deforestation, fisheries depletion, soil erosion or toxic emissions that harm human health, weak environmental policy may yield short run income gains if trade induces increased production, but long run income losses can occur as increased market pressures lead to depletion of the resource stock. In such cases, effective environmental policy is a crucial component of a policy aimed at developing long run international competitiveness.

Similarly, policies aimed at reducing consumption-generated pollution apply to all goods used in a country. Therefore standards raise costs for both domestic and foreign producers and hence do not necessarily place domestic firms at a disadvantage. There is evidence (mostly emerging from the United States) that tightening environmental policy in the manufacturing sector to tackle production-generated pollution has a small, negative effect on indicators of international competitiveness such as net exports or new investment in the affected sectors. However, factors such as capital abundance, labour, location, institutions and agglomeration effects are more important than environmental policy in determining firm location choice and competitiveness.

Trade plays several critical roles in relation to global or trans-boundary environmental problems, notably; the linkage between trade and environmental agreements, and leakage i.e. that reduced pollution in one jurisdiction, as a direct result of policies to cap emissions, may be offset by increased pollution elsewhere. Concerns around carbon leakage have increased the likelihood of some form of border taxes imposed on imports of carbon intensive goods from countries that do not join a coalition to reduce emissions. While studies suggest that such border taxes mitigate carbon leakage, they could have the knock-on effect of shifting some of the costs of emission reductions from developed to developing countries via terms of trade effects. Potential alternatives should be considered which can mitigate carbon leakage while avoiding shifting abatement costs to developing countries with less stringent environmental regulations. Export taxes or voluntary export restraints applied to carbon intensive production for example may be a viable, preferable alternative.

Green industrial policy is being developed across governments to hasten the development of low-carbon alternatives to fossil fuels. It is motivated by many of the same considerations that

apply to general industrial policy and shares many of the same debates. However, there are significant differences, namely that whereas the success of a general industrial policy depends on the ability of the target industry to meet market challenges that are largely external to the policy, the profitability of an industry targeted by green industrial policy depends to a great extent on the type and magnitude of environmental policy that will be used in the future. Green industrial policy provides a means of sharing the policy-induced risk and also of influencing future policy. Green industrial policy should be accompanied by regulation in order to avoid producing a Green Paradox i.e. that it lowers future cost of carbon substitutes, lowering the future demand for and price of carbon-based fuels and encouraging resource owners to shift future sales into the current period.

Various green economy / green growth support measures such as taxes and subsidies are being employed, both on the production and consumption sides *e.g.* subsidies are heavily involved with biofuels or electricity-generation throughout the value chain. In order to fully understand the trade implications of such policy measures, however, we must bridge the following information gaps:

- the effects of environmental policies on competitiveness in developing countries,
- interactions between trade openness and depletion of natural capital,
- comparison of models assessing carbon leakage,
- need for a broader toolbox to analyse border tax adjustments,
- empirical evidence on how the Clean Development Mechanism projects affect technology transfer, and
- databases with carbon intensities at the sector and firm level.

Technology and innovation

Moderator

Mr. Simon Upton, OECD

Presentations

Mr. Robert Stavins, Harvard University

Mr. David Popp, Syracuse University

Mr. Nick Johnstone, OECD

Mr. Carlos Muñoz, Autonomous Technology Institute of Mexico

Summary

Market forces alone are insufficient to incentivize large-scale development and diffusion of environmentally friendly technologies. There remains a significant gap between the need for and benefits of green technology (and in many cases existence of technology) and the adoption or successful diffusion of this technology. This can be potentially addressed through effective innovation and environmental policies. New technology adoption will come from having the right price signals combined with smart regulation and strategic support. Three key principles of environmental policy design have been identified to encourage green innovation: Stringency (i.e. how ambitious the policy objective is in relation to Business As Usual), Predictability (i.e. how certain and credible the signal is given by the policy) and Flexibility (i.e. how much space is provided to identify new technologies and methods).

Substantial research exists on innovation for green growth. However, this is scattered and focuses on important, but specific issues. In order to create a complete assessment, we need to bring together these different elements of analytical and empirical work. This should include a particular focus on how to spur innovation on radical – or breakthrough – innovation rather than on incremental innovation. The urgency linked to the climate implies that the speed of innovation, adaptation and diffusion needs to be significantly quicker in order for it to be able to bring about transformational change.

The following topics in particular have been identified as important to pursue:

- Leapfrogging potential – investigating which technologies could give developing countries an opportunity to leap through phases of development - in particular linked to the use of energy or natural resources.
- Measurement – Collecting a comprehensive dataset of evidence on innovation and diffusion experience in developing countries. This would allow further research on how these happen in developing, where and at what pace.
- Alternative instruments for innovation – Considering the effectiveness of alternative instruments such as, for example, prizes and advance purchase agreements, in generating innovation in developing countries.
- Picking winners – Picking winners among technologies is almost inevitable. The difference is that different countries choose different ways of doing it. While some countries will prefer markets to pick winners, others have the government pick winners, and other have a mix of public and private entities identifying key technologies in close cooperation. Research on the comparative effectiveness of these different choices in spurring innovation would prove very useful for policy makers.

- Innovation for the poor – Collecting existing evidence on innovation, diffusion and commercialization of non-high tech innovation originating in poorer countries and tailored to the needs of poorer people, in order to provide an understanding of the characteristics and scale of such forms of innovation.
- Role of price signals in creating innovation – Collating evidence on the role of price signals in generating innovation and diffusion to provide a comprehensive and systematic approach to the issue with clear lessons for policy makers.
- Fiscal reform- Exploring the implications of fiscal reform to change tax incentives from taxing incomes to taxing resources for innovation and diffusion.
- Enabling Environment – Learning from existing research on the characteristics of business environments most likely to generate innovation and foster diffusion and adoption of new technologies. In particular looking at the mix of skills, incentives, institutions and governance that could promote green technologies.
- Spill-overs – Extending existing research on what circumstances generate spill-overs across sectors, where technologies created for a specific sector are used in other sectors, to assess whether such spill-overs are happening for green technologies as well, into what sectors and with what productivity consequences. This should provide an estimate of the overarching impact of innovation on the wider economy.

Green Employment

Moderator

Mr. Joe Grice, Office of National Statistics, United Kingdom

Presentations

Mr. Alex Bowen, London School of Economics

Mr. Richard Morgenstern, Resources for the Future

Mr. Paul Swaim, OECD

Ms. Ana Sanchez, International Labour Organization

Summary

Green employment is crucial to the green economy/green growth debate not only due to the associated analytical challenges but also due to the centrality of labour market issues within the political economy of green growth reforms.

The link between green growth and labour market performance remains an open question. While most studies to date predict little or no impact of green growth regulation on employment levels, this is not necessarily the case given the current context of slow growth and high unemployment. More precise estimates are needed of both job gains and job losses across sectors, though we should recognize that the latter are more easily identifiable than the former. Comparability is also problematic given that estimates of green job creation are currently based on different definitions. Not all environmental measures are equally job friendly and at the same time not all green jobs are necessarily high productivity jobs. The latter adds another issue of avoiding lock-in in the long term to green jobs with low-productivity in order to create more jobs in short term. There is also still a significant lack of data on green employment across and within individual developing countries.

We need to develop a better understanding of the interactions between labour market and environmental policies and objectives, and identification of those measures which can promote decent work conditions. The ILO stipulates that green jobs need to be decent work which contribute to environmental goals, including for example, reduced consumption of energy and raw materials, reduced greenhouse gas emissions and minimization of waste and pollution. In terms of the employment effects of green growth and green economy policies it can be argued that the transition will involve a degree of labour reallocation away from energy/resource intensive activities to cleaner alternatives. The overall employment effect will hence be positive for some sectors and negative for others.

OECD's recent assessment of the labour market impacts of GHG mitigation policy shows that only a small portion of the total workforce is affected. While the most intensely polluting industries account for a large share of total CO₂ emissions, they account for only a small share of total employment. OECD ENV-Linkages modelling work shows that ambitious climate mitigation policy would result in only a slight fall in real GDP over 2015-2030 but in relatively larger percentage decreases in real wages. This indicates a potential risk that workers could bear a disproportionate share of the adjustment costs, in the absence of compensating policies. Recycling revenues from carbon taxes in order to reduce the taxation of labour income can cushion the fall in after-tax wages. At the same time, aggressive mitigation policy is likely to alter

the sectoral composition of employment (as compared to business as usual) with fossil fuel industries experiencing the largest declines.

The choice of macro-economic framework – and the implicit or explicit assumptions – is crucial for painting an accurate picture of the employment effects of green policy interventions. Neoclassical computable general equilibrium (CGE) models with full employment yield different results to multiplier models with Keynesian unemployment. In addition, no model accounts for how green jobs will be financed, in particular in developing countries. There are particular dangers around extrapolating the conclusions on the potential for green job creation in industrialised economies to developing countries. Results are likely to differ significantly given different environmental challenges faced, natural capital endowments, institutional capacity and differences in labour market functioning and industry structures.

On the basis of this, particular areas identified for further research include:

- Development of a green jobs framework at the macro-level, moving away from the assumption of full employment and allowing for comparability across countries,
- Analysis of green jobs at the sectoral level,
- More case studies to account for the diversity of experience across countries,
- Analysis of who is behind green jobs (type of business, skilled vs unskilled, as well as gender dimension),
- Analysis of labour market consequences of natural resource management policies/practices,
- Identification of skills bottlenecks, and
- Review of whether there is scope for targeted labour market policies during the green growth transition vis-à-vis other structural processes (*e.g.* review of specific policies for sunset industries).

Natural Resource Management

Moderator

Ms. Alice Kaudia, Environment Secretary, Kenya

Presentations

Mr. Jeffrey Vincent, Duke University

Ms. Urvashi Narain, The World Bank

Mr. Pavan Sukhdev, GIST Advisory

Summary

Natural capital is central to economic development and human welfare, in particular amongst the rural poor and most vulnerable population groups whose income is much more dependent on natural resources.

While a wide range of values have been estimated for ecosystem services, in general they have been low and this may derive from their narrow focus. Many of these values are already reflected in GDP however they are implicit values that are often misallocated between sectors. The valuation of forest ecosystem services can be seen as a case in point: there are a wide range of values, from Costanza's study to much more conservative estimates, with many of the values from forests such as nutrient provision and water regulation being picked up in the agricultural sector.

In considering natural resource management it is important to also make the links between poverty and fragile lands, showing that the poor are deeply dependent on the stock and availability of natural capital and are most vulnerable to its degradation. We must question the optimal use of natural capital in the green economy transition and ask how individual countries can best optimize their endowments of natural capital into improved well-being and social equity.

Looking at four key sectors: agriculture, fisheries, forests, and water and sanitation we can outline the key relationships between access to and maintenance of natural capital for social equity, noting that more than 400 million small farms constitute 60% of total agricultural production in the world. In addition, small increases in productivity, particularly through organic and low impact tilling techniques can translate into a large welfare gain for small farmers. Similar relationships between access to natural capital and poverty reduction can be seen in fisheries and water and sanitation sectors where the livelihoods of many are dependent on publically held wealth in the form of natural capital and poverty.

Finally, metrics and indicators for measuring progress and managing natural capital are a fundamental component of any strategy of economic transformation to a green economy. On metrics and wealth accounting, the Wealth Accounting and Valuation of Ecosystem Services (WAVES) study —provides a more complete picture of total wealth including natural capital as opposed to the size of the economy or economic activity as reflected in GDP. We should also look into the question of how resource rents are reinvested, noting that benefits of natural capital flows may be squandered or inequitably distributed.

Key areas for further research have been identified as:

- What are the links between poverty and natural resource management? How can payments for ecosystem services, for example, contribute to poverty reduction?
- How to use a good endowment of natural capital to move towards green growth? Including the role of pricing and rent,
- Scaling up of valuation techniques: there are good tools at the micro-level but not at the macro-level.
- Linking bio-physical data with valuation techniques, and
- Negotiation of royalties for natural resources and the need for transparency; promotion of fair trade in natural resources.

Behavioural economics and green growth

Moderator

Mr. MK Lee, Global Green Growth Institute

Presentations

Ms. Elke Weber, Columbia University

Mr. Howard Kunreuther, University of Pennsylvania

Mr. Dirk Messner, German Development Institute

Summary

Green growth choices are not always rational and based on valuation and comparison of options. Actions to foster behavioural and social change should be seen as a crucial component of any green growth strategy. For example, the barriers to adopting energy efficient technologies are often linked to information deficits, principal agent problems, automatic and habitual choices, fears of problems with new technologies and upfront higher costs looming large with future savings heavily discounted and too small for attention. Green growth choices are arguably discouraged by inertia, status quo biases and short time horizons. Behavioural solutions could seek to address cognitive and motivational deficits (material, psychological and social).

Some of the most effective ways to encourage greener consumption and production choices could include to: (1) use social norms and imitation by getting prominent and trusted agents to model green growth choices, (2) make green growth choice options the default, which minimizes effort and implies endorsement of the default (e.g. building codes, transportation or other infrastructure decisions), (3) provide attractive labels for green growth choices which emphasise co-benefits and avoid negative associations, and (4) avoid fear tactics as it tends to work only very briefly.

The role of multi-year loans and insurance could be investigated further as a tool for stimulating green investment and promoting green growth strategies. Key decision makers arguably do not invest in risk-reducing measures prior to a disaster e.g. farmers, communities and governments who are reluctant to insure themselves against weather-related events such as droughts or severe flooding. Such behaviour can be attributed to systematic biases and heuristics including budgeting heuristics, safety-first behavior, under-weighting the future, myopic behavior, procrastination or underestimation of risk. Risk management tools such as multi-year insurance and multi-year loans can incentivise individuals to undertake protective measures.

Green transformation challenges can be usefully divided into three specific items: (1) the need for a global transformation beyond national adjustment processes, (2) acute time pressures with longer term perspectives needed, (3) the need to govern and manage the green transformation, reflecting the fact that this large scale change is not an evolutionary process but a crisis driven transformation. Several theories and concepts can help to conceptualise the green transformation, including historical research, innovation and organizational theory referring to incremental vs radical change, transitions research looking at co-evolution, agents of change and experiments of innovation, and actors-oriented institutionalism driven by cognitive frameworks, interests and politics and norms and values.

The transformation trajectory is certainly not linear and will find multiple path dependency problems. However, the legitimacy of the BAU scenario is eroding, the number of actors of change is growing, the norms, values and heuristics are shifting (*e.g.* OECD work on welfare and measurement) and these are all contributing to the dynamics of change. The interaction of policies and the accumulation of multiple dynamics are all creating co-evolution effects which are scaling up changes and accelerating the diffusion of low carbon concepts.

Behavioural economics could prove to be very useful to test green growth policy options, limiting trials and errors and tackling political barriers. The main knowledge and action gaps identified in relation to behavioural economics and green growth are as follows:

- An evaluation of policy options based on behavioural and political feasibility criterion in addition to efficiency and equity,
- Involvement of psychologists and political scientists to design and test ensembles of interventions in the field. Behavioural economics can contribute techniques and tools to help address impediments to reform and can contribute to design a better narrative and entrance point for stakeholders,
- Testing theories about human motivation and cognition in developing countries,
- Further research on what has worked so far in fostering behavioural change in developing countries,
- Further impact evaluation of green growth policies, and
- Compilation of best practices on behavioural change.