‘Green’ growth: what does it mean?

Alex Bowen reviews current thinking about the role of ‘green’ growth.

For many economic policy-makers around the world, the term 'green' growth has become a talisman, a way of invoking steady increases in output without adverse environmental consequences. The advanced industrial nations' economic advisory think tank the Organisation for Economic Co-operation and Development (OECD) has developed a 'green' growth strategy[1]. The multilateral development banks have taken up the term, emphasising in June 2012 in the context of the Rio+20 Conference that "the need to transition toward green growth has been recognised as key to sustainable development and prosperity". The Asian Development Bank insists that "… green growth is an imperative, not a luxury, for developing Asia"[2]. The World Bank published *Inclusive Green Growth: The Pathway to Sustainable Development* in May 2012 and has set up a Green Growth Knowledge Platform in collaboration with the OECD, the UN Environment Programme (UNEP) and a new international organisation, the Global Green Growth Institute. Some emerging-market economies have been at the forefront of this movement, with the Republic of Korea in particular organising its economic recovery efforts around a 'green' growth strategy announced in June 2009 and aggressively promoting the concept in international forums.

However, it is not clear whether this new emphasis on 'green' growth represents a paradigm shift or just spin to cover up inconsistencies between economic and environmental objectives of governments.[3] In principle, there are enormous opportunities for policy-makers around the world to improve economic and environmental outcomes at the same time. In practice, several difficult challenges will have to be overcome if these improvements are to be brought about. Although these definitions (see **Box 1**) extend beyond concerns about climate change, the last two definitions explicitly flag the need for growth to be low-carbon growth, while the OECD and World Bank emphasise the need to cut greenhouse-gas emissions drastically and decarbonise production, especially in the energy and transport sectors. It is clear that concern about the possible consequences of human-induced climate change has increased the urgency of making growth more sustainable. The other striking feature of the definitions

is that they treat economic growth as desirable. There is no sympathy for the view that "[T]he term sustainable growth should be rejected as a bad oxymoron" or that one should seek "prosperity without growth"[7,8]. Growth – of the right type – is seen as an effective way of lifting people out of poverty, reflecting a widespread view among development economists[9,10,11]. The growth narrative also recognises the attachment of politicians in both developed and developing countries to growth in the short term.

BOX 1. WHAT IS 'GREEN' GROWTH?

Despite the widespread use of the term 'green' growth, there is no universally agreed definition, but there is a broad consensus about what it means. It is very often treated as a synonym for or an aspect of sustainable development. For example, the OECD defines 'green' growth as "fostering economic growth and development, while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies"[1]. That brings to mind the well-known definition of sustainable development in the Brundtland Report of 1987 – development that "meets the needs of the present without compromising the ability of future generations to meet their own needs"[4].

The World Bank regards 'green' growth as "growth that is efficient in its use of natural resources, clean in that it minimises pollution and environmental impacts, and resilient in that it accounts for natural hazards and the role of environmental management and natural capital in preventing physical disasters"[5]. It adds the rider that "this growth needs to be inclusive", thus acknowledging the three pillars – economic, environmental and social – of sustainable development. And it argues that "inclusive green growth is not a new paradigm. Rather, it aims to operationalise sustainable development by reconciling developing countries' urgent need for rapid growth and poverty alleviation with the need to avoid irreversible and costly environmental damage". For some other development agencies, "Green growth is, in general terms, economic progress that fosters environmentally sustainable, low-carbon and socially inclusive development"[6], while for the Asian Development Bank, "Low-carbon green growth is a pattern of development that decouples economic growth from carbon emissions, pollution and resource use, and promotes growth through the creation of new environment friendly products, industries and business models that also improve people's quality of life".

Glossary: Steady state economics

Herman Daly combined limits-to-growth arguments, theories of welfare economics, ecological principles, and the philosophy of sustainable development into a model he called steady state economics. A steady state economy is an economy of a relatively stable size, with a stable population. Consumption remains at or below the Earth's carrying capacity.

DOES 'GREEN' GROWTH MAKE ECONOMIC SENSE?

As the author of the influential Stern Review of the economics of climate change argues, "High-carbon growth would kill itself: first from the high prices of hydrocarbons that could result, and second, and more fundamentally, from the very hostile physical environment it would create"[12]. The World Bank agrees, concluding that "[E]conomic growth alone is unlikely to be fast or equitable enough to counter threats from climate change, particularly if it remains carbon intensive and accelerates global warming. So climate policy cannot be framed as a choice between growth and climate change. In fact, climate-smart policies are those that enhance development, reduce vulnerability, and finance the transition to low-carbon growth paths"[13].

This conclusion is strengthened if a risk-management perspective is taken, given the possibilities of catastrophe and the passing of irreversible tipping points in ecological and geophysical systems. And it is strengthened still further if the consequences of inaction across a wide range of environmental challenges are considered[14].

Nevertheless, there are concerns that future economic benefits will only be secured by heavy investment in low-carbon infrastructure, buildings, plant, equipment, and research and development (R&D) in the near term, crowding out households' consumption and reducing their real purchasing power. This is the message from most conventional economic modelling exercises of the gross costs of keeping the global mean temperature increase since pre-industrial times to below 2 °C (although the scale of these incremental costs is much debated, ranging from 1 per cent of world output to an order of magnitude higher or, in some cases, infinite – which would make it technically impossible to keep below 2 °C). Politicians worry that, when it comes to the ballot box, today's voters will not attach very much weight to enhancing growth for generations as yet unborn. Also, politicians are inclined to focus on performance indicators that the public can monitor over the electoral cycle rather than the longer term, so real gross domestic

product (GDP) receives more attention than forecasts of what the concentration of greenhouse gases in the atmosphere will be towards the end of this century.

The 'green' growth' narrative offers policy-makers a more optimistic view about short-term growth prospects. The key economic insight is that, to tackle climate change, several interlinked market failures have to be tackled. Market failures arise when the competitive markets do not result in efficient patterns of production and consumption (given the distribution of income). Greenhouse gases create one market failure because they are an externality to production – economic activities such as electricity generation result in emissions that damage the climate without the emitters having any market incentive to limit them. The economists' prime remedy is to price emissions, preferably uniformly across countries and sectors, so as to create a powerful incentive to achieve emissions reductions in the most cost-effective way without requiring policy-makers' intervention in detailed production decisions. A carbon tax or emissions trading system are possible tools.

But just as modern economies tend to produce too many emissions of greenhouse gases without policy intervention, they tend to produce too little in the way of innovation, because people with useful new ideas are not rewarded by all the other people who could benefit from them – the generation of new knowledge has positive externalities. Hence the benefits to society as a whole from R&D investment are often much greater than the benefits captured by the firms undertaking the investment. The social returns exceed the private returns, perhaps on average by a factor of four, so the private incentive to innovate is less than is socially desirable[15]. One way of dealing with this problem is to strengthen intellectual property rights but, without appropriate regulation, that can simply create monopoly power, another source of market failure. There may also be economies of scale in knowledge production, another phenomenon likely to lead to problems with a purely *laissez faire* solution. Highly imperfect information unevenly distributed across market participants makes financing novel technologies difficult. Other market failures have been described in setting up networks (such as electric vehicle charging points and carbon capture and storage (CCS) pipelines) and in providing public infrastructure (such as low-carbon public transport).

The advocates of 'green' growth argue that all these market failures need to be corrected to reduce greenhouse-gas emissions in a cost-effective way and that, if they are, there will be broad benefits across the economy as a whole, many of which will accrue in the short term. In particular, there will be more innovation, and economies will be nudged on to development paths with more appropriate infrastructure and land use. Working out how to correct any given market failure may be difficult: not every environmental problem is analytically as straightforward as climate change and some market failures have persisted – for example, in the world of finance – because this challenge has not yet been cracked. But the difficulty is primarily one of instrument design rather than resource cost.

"it is fortunate that the dawning realisation of the need for a step change in investment in low-carbon technologies has coincided with a period where such a step change is more likely to boost growth than displace other spending."

It is a moot point whether all the potential benefits of attacking market failures should be attributed to the mitigation of environmental problems. After all, the incentive problems facing potential innovators have been well known for a long time and have given rise to imaginative thinking about patent law, R&D subsidies, regimes for intellectual property transfer across borders and incentive mechanisms such as prizes. Innovation is worth encouraging for its own sake. But a case can be made that it is the dangers of environmental degradation, and particularly the threat of sharp climate change, that have raised considerably the perceived costs of neglecting market failures.

The possible short-term benefits of 'green' growth policies are perhaps best illustrated by reference to a particularly large-scale market failure that occurs intermittently – macroeconomic recession[16]. One way of correcting such a failure, if it is rooted in an excess of planned private saving over planned private investment, is to use time-limited, debt-financed fiscal expansion. But how should such an expansion be structured? The proponents of 'green' growth argue that the silver lining to the cloud of the worldwide economic slowdown is that increased spending on 'green' investments – the 'smart' grid, renewable energy, insulation of housing and so forth – is less likely to crowd out other investment or household consumption. According to this line of argument, it is fortunate that the dawning realisation of the need for a step change in investment in low-carbon technologies has coincided with a period where such a step change is more likely to boost growth than displace other spending.

More speculatively, there may also be longer-term benefits of a shift towards 'green' growth. A sustained change in relative prices will open up new markets for low-carbon and other more environmentally friendly good and services. If that change is complemented by efforts to improve incentives to innovate, particularly in 'green' technologies, a long wave of productivity growth could be triggered, with firms competing to introduce new 'green' products and ways of doing things – an example of the type of burst of innovation that the Austrian economist Joseph Schumpeter argued is at the root of long-run growth. However, any New 'Green' Industrial Revolution will be peculiarly dependent on credible, consistent and very long-term government policy with respect to market failures[17]. It will also need ingenuity in devising new 'green' goods and services that appeal to consumers. For example, on the one hand, the problem with 'green' energy from renewable sources is that it often appears indistinguishable from traditional energy. But, on the other, the IT control systems necessary for 'green' energy and enhanced energy efficiency could be used to deliver novel services to the home, such as remote control of household appliances and real-time monitoring of energy use.

THE CHANGING STRUCTURE OF THE ECONOMY

'Green' growth, especially if it amounts to a New Industrial Revolution, is likely to transform the structure of economies. For example, although the energy sector accounts for only a few percentage points of GDP in most developed countries, energy use is pervasive. Carbon pricing would change production methods and technologies in construction, transport and manufacturing. Carbon pricing would incentivise people to buy fewer carbon-intensive manufactured products and more services with a low carbon footprint. If other greenhouse gases were to be treated in the same way, that would have profound consequences for agricultural practices – discouraging cattle-raising, for example. More broadly, 'green' growth is consistent with the development of the 'weightless economy', in which a much higher proportion of economic activity is dependent on the generation of new ideas and a much lower fraction on the throughput of physical resources[18,19]. Thus 'green' growth goes with the grain of the shift towards service industries seen in most developed countries in recent decades.

This perspective draws attention to how 'green' growth is likely to change the structure of economies across all sectors. High-carbon activities at one end of the spectrum and environmental goods and services at the other are likely to see the biggest quantitative changes in output and employment as a result of a shift towards 'green' growth but qualitative change will be widespread – and not necessarily where most expected. There is a parallel here with the impact of the information and communications technology revolution, which (according to some studies) has had its major effect on US productivity not via the ICT sector itself but in the wholesale and retail sector.

BOX 2. WHAT IS A GREEN JOB?

'Green' jobs can be regarded as those associated with environmental objectives and policies. Some definitions of 'green' jobs or related concepts focus on occupations and skills with an identifiable environmental focus, but most focus on employment in industries (or specific projects) with products deemed to be of environmental benefit. Such benefits can be defined more or less broadly – for example, some concentrate on renewable energy, including or excluding biofuels, while others also include environmental services and employment related to improving energy efficiency or developing less-carbon-intensive products (e.g. building railways). UNEP has adopted a definition that attempts to incorporate aspects of job content as well as the characteristics of industry goods and services[20]. It defines 'green' jobs as "work in agricultural, manufacturing, research and development (R&D), administrative, and service activities that contribute substantially to preserving or restoring environmental quality". The European Commission's Environment Directorate have used the OECD/Eurostat definition of the environmental goods and services industry comprising "activities which produce goods and services to measure, prevent, limit, minimise or correct environmental damage to water, air and soil, as well as problems related to waste, noise and eco-systems. This includes technologies, products and services that reduce environmental risk and minimize pollution and resources"[21].

'Green' jobs account for around 1.7 per cent of total paid employment in Europe[22] on the OECD/Eurostat definition of the environmental goods and services industry and perhaps 0.25 per cent of the global employed labour force of around 1.8 billion on the UNEP definition. Jobs in renewable energy in particular are forecast to by UNEP to rise from 2.3 million in 2006 to 20 million in 2030. The 'clean energy economy' defined by the US Pew Center[23] accounts for around 0.5 per cent of US jobs while the environment industry is responsible for 1.6 per cent of Korean employment directly and indirectly[24].

These numbers appear relatively small. Also, the transition to 'green' growth is likely to lead to job losses in traditional high-carbon sectors such as mining and oil refining. But in one sense the estimates miss the point.

'Green' growth policies could in principle create jobs in sectors not covered by statisticians' definitions of environmental goods and services, such as education, media and business services. This could be even more important in poorer countries, where 'green' growth policies with respect to agriculture, forestry and off-grid solar power could raise rural employment and reduce migration to the cities. 'Green' innovation is taking place in many different industries, including some such as the car industry that are not thought of as particularly 'green'. The evidence on patents related to climate-change mitigation suggests that China and the Republic of Korea have taken this to heart more than several higher-income countries.

CONCLUSIONS

'Green' growth has become a familiar buzz word among economic policy-makers in rich and poor countries alike. The concept is closely related to that of sustainable development, but with more emphasis on growth and on mitigating climate change, which is widely perceived as the major long-term challenge to sustainability. But its use amounts to more than just spin. Given the threat of runaway climate change and environmental degradation, 'green' growth is likely to be the only sort of growth that is feasible in the very long run. And in the shorter term, there will be substantial potential benefits from a comprehensive correction of market and policy failures connected to environmental problems. In a sense, it is fortuitous that this realisation is dawning at a time when, because of the global slowdown, there is less competition for funds for investment. Engineering a transition to 'green' growth could also kick-start more innovation across the board, leading in more optimistic scenarios to a New Industrial Revolution. Much will depend on learning more about how economic activity affects the environment and what precisely are the features that lead to market and policy failures. ES

Dr Alex Bowen joined the Grantham Research Institute on Climate Change and the Environment at LSE in 2008 as a Principal Research Fellow, after many years at the Bank of England, most recently as Senior Policy Adviser. He first became involved in climate change issues when seconded to work on the Stern Review. His research interests include the design of public policies for a low-carbon economy and the macroeconomic aspects of climate-change policies.

SOURCES

1. OECD (2011) *Towards Green Growth*. OECD, Paris.
2. ADB–ADBI (2012) *Policies and Practices for Low-Carbon Green Growth in Asia: Highlights*. ADB, Manila and ADBI, Tokyo. www.adb.org/publications/policies-and-practices-low-carbon-green-growth-asia-highlights.
3. Bowen, A., and Fankhauser, S. (2011). The green growth narrative: Paradigm shift or just spin? *Global Environmental Change*, **21** (4) pp1157–1159.
4. UN (1987) *Report of the World Commission on Environment and Development: Our Common Future*. UN, New York.
5. World Bank (2012) *Inclusive Green Growth: The Pathway to Sustainable Development*. World Bank, Washington D.C.
6. UN-ESCAP, ADB and UNEP (2012) *Green Growth, Resources and Resilience: Environmental Sustainability in Asia and the Pacific*. ESCAP, ADB and UNEP Regional Office for Asia and the Pacific, Bangkok.
7. See Daly, H.E. (1990) Toward some operational principles of sustainable development. *Ecological Economics*, **2** (1) pp1–6.
8. Jackson, T. (2009) Prosperity without Growth: Economics for a Finite Planet. Earthscan, London.
9. See, for example, *World Bank (2001). Globalization, Growth and Poverty:Building an Inclusive World Economy*. World Bank, Washington D.C. and Oxford University Press, New York.
10. See, for example, Adams, R.H. (2004) Economic Growth, Inequality and Poverty: Estimating the Growth Elasticity of Poverty. *World Development*, **32** (12) 1989–2014.
11. See, for example, Collier, P. (2008). The Bottom Billion: Why the Poorest Countries are Failing and What Can Be Done About It.. Oxford University Press, Oxford.
12. Stern, N. (2010) Climate: What you need to know. New York Review of Books, 24 June.
13. World Bank (2009) *World Development Report 2010: Development and Climate Change*. World Bank, Washington D.C.
14. This is made very clear in OECD (2012) *The Environmental Outlook to 2050: The Consequences of Inaction*.. OECD, Paris.
15. Popp, D. (2006) ENTICE-BR: The effects of backstop technology R&D on climate policy models. *Energy Economics*, **28** (2) pp188–222.
16. The interaction of business cycles and environmental policies is discussed further in Bowen, A., and Stern, N. (2010) Environmental policy and the economic downturn. *Oxford Review of Economic Policy*, **26** (2) pp137–163.
17. The lessons of history are discussed in Pearson, P.J.G., and Foxon, T.J. (2012) A low carbon industrial revolution? Insights and challenges from past technological and economic transformations. *Energy Policy*, **50** pp117–127.
18. The weightless economy is discussed further in Coyle, D. (1998) *The Weightless World: Strategies for Managing the Digital Economy*. MIT Press, Cambridge, Massachusetts.
19. Quah, D. 1999. *The Weightless Economy in Economic Development*, Centre for Economic Performance Discussion Paper No. 417.. London School of Economics and Political Science, London.
20. UNEP/ILO/IOE/ITUC (2008) *Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World*. UNEP/ILO/IOE/ITUC, Geneva.
21. OECD (1999) *The Environmental Goods and Services Industry: Manual for Data Collection and Analysis*. OECD, Paris.
22. EC (2007): Facts and Figures: Links Between EU's Economy and Environment. Office for Official Publications of the European Communities, Luxembourg.
23. Pew Center on the States and Pew Environment Group (2009) *The Clean Energy Economy: Repowering Jobs, Businesses and Investments in America*. The Pew Charitable Trusts, Washington D.C. and Philadelphia.
24. Global Green Growth Institute (2011) Green Growth in Motion: Sharing Korea's Experience. GGGI, Seoul.