

The economic impacts of UK labour productivity-enhancing industrial policies and their spillover effects on the energy system

Academic and policy discussions increasingly recognise the wider impacts of energy policy on the macro-economy. For example, recent analyses on energy efficiency policies emphasise the stimulus to economic activity that these typically generate and their potential impacts on distributional issues, while policies aimed at growing the offshore wind sector have associated targets for the economic impacts that could be secured.

However, interaction in the opposite direction, that is the impact of economic policies on the energy system, has been comparatively neglected and, in particular, there has been little system-wide analysis of the spill-over effects from economic policies to the energy system.

The studies that have looked at the impact of economic policies on the energy system have tended to focus upon specific policies that have a high correlation with energy and/or environmental outcomes - for example, the recent debate here in Scotland with regard to Air Departure Tax.

But what about economic policies more broadly?

Neglecting consideration of these impacts might lead to inefficiencies and unforeseen conflicts (or complementarities) between energy and economic policy goals. With politicians claiming 'a climate emergency' and ambitious targets being set for net zero carbon emissions in just a few decades time, could policies to promote economic objectives actually be adding to the challenge?

Through the research programme of the [UK Energy Research Centre](#), we have carried out analyses of the potential impacts of a successful Industrial, business and innovation policy on the UK economy and energy-system. In [our recent discussion paper](#) we investigate the system-wide effects of increases in labour productivity; in a companion paper, the effects of successful export promotion policies are explored. These are outlined in references [1] and [2] below.

The energy system impacts of such policies are, in large part, transmitted via their impact on the economic system. It is therefore necessary to adopt an approach that fully captures such interdependence. We do so by employing a UK computable general equilibrium (CGE) model - a large scale macroeconomic model of the UK economy that captures key linkages between economic activity and the energy system.

Key results

At one level, the results of our work on the effects of increases in labour productivity are re-

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assuring: improved labour productivity has a positive long-run effect on all the major indicators of UK industrial policy, including Gross Domestic Product, consumption, and investment.

Our modelling shows that although employment typically falls in the short run, as capacity expands through increased investment the demand for labour increases so that employment ultimately rises.

However, there are simultaneously spill-over effects to key elements of the energy system, typically not helpful for achieving environmental targets. Long- and short-run total energy use and energy used in production increase in response to any improved labour productivity.

However, these increases are always less than the proportionate rise in GDP so that the overall energy intensity of the economy - defined here as energy use per unit of GDP - therefore falls (in contrast to the impact of a general stimulus to exports)

Similarly, if actions are not taken simultaneously to decarbonise the economy, UK industrial territorial CO₂ emissions increase. The emissions-intensity of the economy, defined as industrial territorial CO₂ emissions per unit of GDP, falls however.

Overall, energy policymakers will be concerned about the adverse impact on emissions and although these increases are relatively small, some further adjustment of energy policies would be required to ensure that they are offset.

Policy implications

Our simulation results suggest that there are trade-offs, particularly between achieving energy and economic policy goals. For example, increased labour productivity stimulates GDP but also energy use and territorial industrial CO₂ emissions, whilst reducing employment in the short-run.

Our analysis reveals the extent of energy policy adjustment that would be required to accompany a successful industrial policy in order to maintain a given level of emissions.

Policy makers should therefore be aware that successfully implementing economic policies - for example, the UK Industrial Strategy - might have negative spill-over impact on other policy agenda's such as the UK's Clean Growth Strategy and on the goals of energy policy more generally.

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Much has been made of the focus of energy policy on the quadrilemma of security, price, the environment and the economy.

But our results show that economic policy objectives themselves might pose some tough choices for policymakers wishing to support a smoother transition to wider energy and environmental objectives. The implication is that efforts in the energy sphere may have to go faster and be more ambitious as a result.

Neglecting these spillover effects between the energy and economic systems creates a source of inefficiency in the conduct of policy, and knowledge of their likely scale could be used to develop a more holistic, coordinated approach to policy formation and implementation.

Knowledge of the nature and scale of economy/energy spill-overs offers the opportunity to improve policy co-ordination and over-all effectiveness of both energy and non-energy policies.

The full discussion paper can be accessed at: [The economic impacts of UK labour productivity-enhancing industrial policies and their spillover effects on the energy system](#).

[1] Ross, A. G., Allan, G., Figus, G., McGregor, P. G., Roy, G., Swales, J. K., & Turner, K. (2018a). [The economic impacts of UK trade-enhancing industrial policies and their spillover effects on the energy system](#). UK Energy Research Centre Working paper.

[2] Ross, A. G., Allan, G., Figus, G., McGregor, P. G., Roy, G., Swales, J. K., & Turner, K. (2018b). [Highlighting the need for policy coordination: the economic impacts of UK trade-enhancing industrial policies and their spillover effects on the energy system](#). Fraser of Allander Economic Commentary, 42(3), 53-67.

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