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The Financial Sector and the UK's Net Zero Transition – Considering Economic Welfare Implications of Pathways to Retirement of Fossil Fuel Assets and Local Interventions

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Executive Summary

- The financial sector in the UK has a significant role to play both directly and indirectly in the UK Government's climate and environment targets. This evidence considers one of the EAC's agreed actions: *“likely pathways to the responsible retirement of fossil fuel assets in a way which is compatible with the UK's national interest, reducing the risk of stranded assets and meeting the UK's international climate obligations”*.
- The use of emissions pricing mechanisms including carbon taxes and emissions trading systems (ETSs) such as the UK ETS will potentially have unintended consequences including adverse or regressive effects on economic welfare.
- This preliminary empirical study conducted at Bournemouth University has provided evidence that carbon taxes are unpopular and / or not well understood so we are working on some innovative ideas that can help in educating consumers and producers at national level.
- Our research in this area is ongoing and we will be pleased to share new insights with the Committee in the future if it would support their work.
- We recommend that:
 - (1) subsidies should be designed and implemented to address regressive economic welfare effects;
 - (2) an efficient carbon border adjustment mechanism should be implemented to increase the effectiveness of the UK ETS and minimise carbon leakage;
 - (3) technology mandates and funding (supported by the UK Financial Sector) for green energy transition should be implemented;
 - (4) a 'green finance education policy' should be implemented to raise awareness among consumers and producers of emissions pricing and the significance of the UK's Net Zero Transition, through education at all levels such as schools, universities and commercial

entities including financial institutions perhaps with mandatory training similar to existing safety and security training; and

(5) targeted tax reliefs and grants for low carbon businesses should be introduced to support the UK's Net Zero Transition.

1. Introduction

- 1.1 Policies to move to net-zero include carbon taxes and emissions trading systems (ETSs) such as the UK ETS¹, which will potentially have unintended consequences including adverse or regressive effects on economic welfare, a view that is supported by a large number of international empirical studies².
- 1.2 We recommend the design of specific subsidies (perhaps extending existing subsidies such as the UK Cost of Living Payment due from 14 July 2022) for low-income groups to mitigate the regressive effects of price increases associated with the UK ETS.

2. Measures for Tackling Climate Change

- 2.1 Regulatory policy measures include technology mandates, performance standards and emissions pricing. Emissions pricing takes the form of carbon taxes; cap-and-trade systems or 'emissions trading systems' (known as ETSs)³; hybrid ETS⁴ with a price ceiling and/or a price floor; and carbon border adjustment mechanisms (CBAMs) for example, the UK and the EU both operate a CBAM.
- 2.2 CBAMs may be used in conjunction with either carbon taxes or ETSs. In the case of the EU CBAM the price reflects the carbon price that is established by the market for EU ETS allowances.
- 2.3 CBAMs are important to combat carbon leakage (the movement of industrial activities to countries with weaker carbon emissions measures) but may be seen as 'climate clubs' reducing the competitiveness of carbon-intensive emerging economies. Carbon leakage is a major barrier to the effectiveness of carbon taxes or ETSs and there is a danger of growing numbers of 'pollution haven' nations.
- 2.4 We recommend that CBAMs are necessary when a carbon tax or ETS is implemented. Further measures such as more targeted UK tax reliefs for low carbon businesses should also be introduced. This would help to promote the expansion of the UK's low-carbon economy through domestic supply as well as exporting low-carbon technology and expertise to countries with significant carbon-intensive industries.

3. Theoretical Bases for Carbon Taxes

- 3.1 In economic theory taxes are shown to distort markets resulting in a deadweight loss and a slower rate of economic growth⁵. Introducing taxes such as carbon taxes will usually face scepticism or controversy. If the national product is reduced by taxation, then there will be an overall reduction in societal welfare. Ideally, taxes should be progressive but carbon taxes may be regressive⁶. Inelastic⁷ demand for high carbon goods can result in a high level of tax regressivity and a loss of economic welfare.
- 3.2 The policy justification for introducing carbon taxes derives from the view that intervention may be required to overcome externalities that cannot be addressed through the workings of the free market.

- 3.3 Indirect taxes such as carbon taxes are more distortionary and regressive than direct taxes such as income taxes. However, it is possible to recycle revenues from carbon taxes to reduce income taxes, provide subsidies to those affected by regressive outcomes and provide scope for targeted tax reliefs such as higher capital and revenue allowances for low carbon businesses.
- 3.4 Objections to carbon taxes may also be based on the perceived efficacy (or lack of it) of the measure as compared to other forms of emissions pricing, particularly ETSs. Like carbon taxes ETSs may have an impact on social welfare as ETSs also affect the prices of fossil fuels and carbon-intensive goods.

4. Empirical Evidence of Effectiveness of Carbon Taxes and ETSs

- 4.1 There is little difference in the effectiveness of carbon taxes and ETSs according to the findings in a large number of research studies from many different countries⁸ finding carbon emissions reductions in the range of zero to 1.5 per cent per year⁹. Effectiveness is measured as reductions in carbon emissions but importantly, these studies do not necessarily consider regressivity or deadweight losses.
- 4.2 Given the evidence of the low effectiveness of emissions pricing it may seem surprising that it seems to be supported by a lot of economists¹⁰ but there are different possible approaches to emissions pricing. Key arguments in favour of carbon taxes include cost-effectiveness and considerations of scale and speed. We believe that emissions pricing cannot be effective without an efficient CBAM to tackle carbon leakage (see 2.4 above).
- 4.3 If carbon taxes are regressive then tax revenues may have to be used for subsidies or public expenditure such as green energy or de-carbonising projects. ETSs also raise prices by imposing supply-side constraints and therefore, also have regressive effects. Overall, there is evidence of significant carbon tax regressivity shown by a large number of international empirical studies¹¹.

5. Carbon Taxes, ETSs and Energy Supply Security

- 5.1 Carbon taxes and ETSs have been discussed so far solely in terms of the motivation to reduce carbon emissions nationally and contribute to an improved position in global terms. Another motivation is to reduce the dependence of the UK economy on fossil fuels for strategic reasons and also, for the UK to be the world leader in the transition phase towards zero emissions.
- 5.2 The drive towards energy self-sufficiency based on other sources of energy will require a transition period with associated costs that are difficult to forecast. We recommend public finance (tax reliefs and grants) is used as a catalyst to encourage more private investment including finance from the UK financial sector (banks and other financial institutions) for green energy transition projects.

6. Fairness and Acceptability of Carbon Taxes

- 6.1 Fairness and the perception of fairness are important in the implementation of carbon taxes. The negative public reaction to taxes may be one of the reasons why ETSs are favoured by many nations. ETSs are not so visible to the public.

- 6.2 There is evidence that the public is relatively aware of the concept of tax progressiveness and for that reason, the communication of progressive aspects of the tax design – for example, redistribution of tax revenues to vulnerable groups - can help acceptability and therefore, ultimate implementation and effectiveness of a new carbon tax¹².

7. Preliminary Empirical Study

- 7.1 During a Carbon Tax Conference, we surveyed attendees to identify UK household carbon tax perceptions. The preliminary results highlighted that although the public is aware of the importance of reducing carbon dioxide emissions, carbon taxes do not have broad public support.
- 7.2 Up to 65.6% of UK residents are unaware of investment plans by the government, especially in terms of energy-saving benefits and support available to poorer households. Consequently, up to 75% of the public support investing in public transport to provide a form of relief to low-earning households, whilst looking after the environment.
- 7.3 Evidence shows that energy tax can reduce environmental damage at a national or macroeconomic level, but welfare suffers especially for households within the lower income bracket in the UK. When the data is disaggregated, nearly 60% of UK households are forced to reduce energy use as a money-saving strategy because of the very high costs.
- 7.4 The very high energy costs mean that poorer households must choose between eating and heating. This has severe consequences in the form of malnutrition and a negative social impact on people.
- 7.5 The evidence shows the need for more education at all levels (institutions, schools and universities) to raise the awareness of zero-emissions goal significance and the role of emissions pricing.

8. Conclusion

- 8.1 The financial sector in the UK has a significant role to play both directly and indirectly in the UK Government's climate and environment targets.
- 8.2 The use of emissions pricing mechanisms including carbon taxes and emissions trading systems (ETSs) such as the UK ETS has the potential for unintended consequences including an adverse effect on economic welfare and encouraging industrial relocation or imports resulting in carbon leakage.
- 8.3 Our preliminary empirical study finds that carbon taxes are unpopular and/or not well understood by the public. 81.3% of UK residents believe carbon taxes impose more of a cost burden on households' budgets and this is worse for those in the lower income bracket.

9. Recommendations

- 9.1 Subsidies should be designed and implemented to address regressive economic welfare effects.
- 9.2 An efficient CBAM should be implemented to increase the effectiveness of the UK ETS by minimising carbon leakage.
- 9.3 Technology mandates and funding (supported by the UK Financial Sector) for green energy transition should be implemented.

9.4 A ‘green finance education policy’ should be implemented to raise awareness among consumers and producers of emissions pricing and the significance of the UK’s Net Zero Transition, through education at all levels such as schools, universities and commercial entities including financial institutions – perhaps with mandatory training similar to existing safety and security training.

9.5 Targeted tax reliefs and grants for low-carbon businesses should also be introduced.

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¹ The UK Government confirmed that it would implement a UK Emissions Trading System from 1 January 2021 and that following a consultation process the Carbon Emissions Tax would not be implemented – for more details see HMRC and HM Treasury (2021) ‘Carbon Emissions Tax’ available at:

<https://www.gov.uk/government/consultations/carbon-emissions-tax>

² For a summary of many of the international research studies of regressivity of carbon taxes see for example, Kirkpatrick (2022) ‘Carbon Taxes: Reviewing Theoretical Bases and Evidence’. Working Paper. Available at:

<https://ssrn.com/abstract=4127530>

³ A key difference between carbon taxes and ETSs is that the former provides certainty of price and the latter provide certainty of quantity.

⁴ A ‘hybrid ETS’ also provides some price control since it may utilise a guaranteed ceiling and/or floor price.

⁵ For a summary of the reasoning of economists such as Marshall, Dupuit, Pigou and Hicks in considering a deadweight loss arising from a reduction of consumer surplus and producer surplus see for example, Kirkpatrick (2022) ‘Carbon Taxes: Reviewing Theoretical Bases and Evidence’. Working Paper. Available at:

<https://ssrn.com/abstract=4127530>

⁶ A progressive tax is characterised by an increasing proportion of tax payable as income or wealth increases. A regressive tax is the opposite so that at lower levels of income or wealth individuals would have to pay a higher proportion that income or wealth in the form of tax.

⁷ Higher elasticities of demand for goods with higher carbon emissions are likely to be associated with more significant reductions in carbon emissions while the converse is the case if there are low elasticities of demand for high carbon goods. If there is a low elasticity of demand for high ‘carbon footprint’ goods then consumers will pay the higher price including the carbon tax (or share of it).

⁸ A significant majority of the empirical studies of carbon taxes examine data from European countries and most of these are also members of the EU-ETS. Canada (British Columbia) is the major example of a non-European country included among the studies of carbon taxes. The empirical research on ETSs is dominated by studies of the EU-ETS but there are also significant studies performed on two ETSs in the USA. The first of these ETSs in the USA is the Regional Greenhouse Gas Initiative (RGGI) that is operated in the North Western states of the USA and the second ETS is one operated for the state of California by the California Air Resources Board (CARB).

⁹ For a summary of a large number of empirical studies of carbon taxes and ETSs see for example, Kirkpatrick (2022) ‘Carbon Taxes: Reviewing Theoretical Bases and Evidence’. Working Paper. Available at:

<https://ssrn.com/abstract=4127530>

¹⁰ Climate Leadership Council, 2019 available at: <https://clcouncil.org/economists-statement>

¹¹ Please refer to the reference in note 2 above.

¹² For information about research into acceptability of taxes based on communication of progressive aspects of tax design see Kirkpatrick (2022) ‘Carbon Taxes: Reviewing Theoretical Bases and Evidence’. Working Paper. Available at:

<https://ssrn.com/abstract=4127530>