

Mitigating or adapting to climate change, which is optimal for the economy?

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The production of goods and services cause climate change via greenhouse gas emissions. The potential solutions are either mitigation or adaption; each may lead to an economic downturn if implemented. To find an optimal solution, costs and benefits of both approaches are analysed and a case study of East Anglia is observed. I recognised that negative short term economic consequences are probable; however large economic and social benefits are expected in the long run. Both strategies should be used together with equal importance to ensure the optimal outcome for the UK economy.

I. Introduction

The UK is currently recovering from an economic recession and needs to be producing, selling and exporting as many goods and services as possible to gain steady and positive growth once again. However this effort is being overshadowed by the issue of climate change.

The problem is there appears to be a trade off between climate change and firms producing plentiful amounts of output. By changing operational methods of firm production to lower carbon emissions, the UK must either adapt or prevent climate change, whilst realising that lowering output may lead to another recession. I will aim to outline the strategies of mitigation and adaptation to climate change and comment on their economic advantages and disadvantages, and come to a conclusion as to the optimum method to handle climate change whilst taking economic growth into account.

The issue is important for all and especially the reader as everyone will be affected by climate change and the strategies proposed for combating the global problem. My results have found that although adaptation involves enormous costs, it is necessary to avoid economic destruction in the future. I have also concluded that mitigation is also essential as climate change will not stop until firms begin to lower their carbon emissions.

A weakness of my analysis is that I am only taking the economic side into account. There are many other important factors concerning reducing climate change, such as the political and social sides, and as an economist I am biased in my suggestions that economics of the situation is the most important view

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to analyse. A limitation of my study was that most viewable data are based upon predictions, which are not always accurate.

My main insight is that the situation is not as complex as first thought, and both strategies should be implemented as soon as possible. My recommendation for future research is to include the social and political aspects in order to come to a solid and confident conclusion as to the best strategy for combating global climate change.

II. Adaption

Adaptation “consists of initiatives and measures to reduce the vulnerability of natural and human systems against actual or expected climate change effects” (<http://www.ipcc.ch/pdf/glossary/ar4-wg3.pdf>)

The biggest effect that climate change will have is an increase in global temperatures. Many gases in the atmosphere, known as greenhouse gases, absorb infrared radiation, so increased amounts of these gases means the concentration in the atmosphere has increased so more radiation is absorbed; therefore heating up the World which is causing the ice caps to melt and raising the sea levels. (Topic 5: Climate Change p.42)

This will be a big economical problem for the UK as it means that firms and the public will have to relocate from the areas that are predicted to be under sea level. This may be very harmful to regional economies, such as East Anglia (see later). There may be many knock on effects from this, such as a large migration of people to certain areas of the UK, which may increase unemployment as there will not be enough jobs in these regions. Hospitals and schools will also be under pressure as they will need to expand. The results include less consumption and less investment as confidence in certain areas will decrease.

III. Government Budget

Governments must prepare for the changes that are occurring in the environment due to climate change. “Natural disasters are on the increase. Munich Re, one of the world’s largest re-insurance companies, reported that three times as many great natural catastrophes occurred during the 1990s as during the 1960s. Economic losses increased 8 fold” (Brown, 2001, p.13). The evidence suggests that climate change is increasing natural disaster occurrence leading to more government financial assistance; however one could put this down to advances in communication and technology that has increased knowledge the location and occurrence of natural disasters.

Spending upon flood defences and land use change would become a large expense for the economy giving the government options of either increasing spending or directing spending away from sectors

such as healthcare and education towards the adaptation strategies. Increased government spending may result in a larger budget deficit adding to the levels of national debt. Governments may therefore have no other option but to increase taxes, leading to a fall in aggregate demand as people will have relatively less disposable income and goods may therefore be relatively more expensive. This will lead to multiplier effects as spoken about later.

Realistically, governments will not be able to adapt to every consequence of climate change, it is not financially possible, so reducing greenhouse emissions must also occur.

IV. Mitigation

Mitigation involves the reduction of greenhouses gases, and the UK is currently the seventh largest producer of carbon dioxide emissions as seen in figure 1. There are mitigation methods including lowering levels of output through government subsidies or a carbon tax; or installing industrial equipment that produces less greenhouse gases.

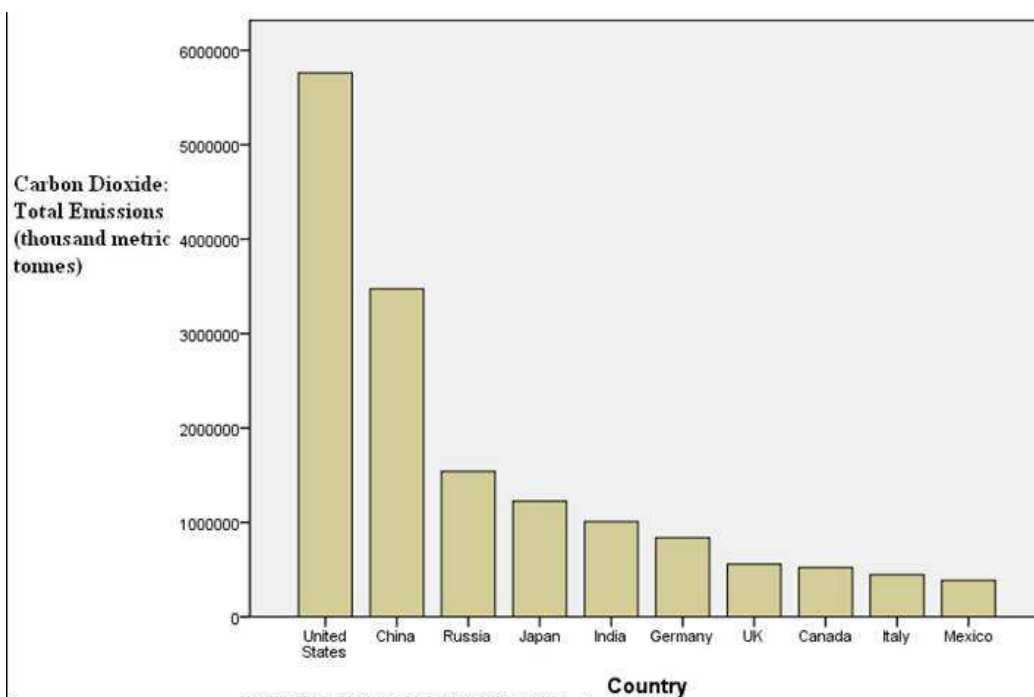


Figure 1: graph made in SPSS by data from:
http://www.nationmaster.com/graph/env_co2_emi-environment-co2-emissions

V. Lowering Output

A strategy concentrating on lowering carbon emissions through lowering the levels of output is perhaps not a recommended method when taking the economy into account. A firm producing less output will sell less of its product and make less revenue. This will mean the firm may have to make drastic operational changes such as letting workers go, creating a rippling multiplier effect through the economy as these newly unemployed people will have less disposable income to spend upon goods and services from other firms, which in turn means that these firms will also have to let workers go, and the cycle begins again. Aggregate demand is the “total planned or desired spending in the economy,” (Samuelson and Nordhaus, 1989, p.965) and the main component is consumption which is made up of spending upon goods and services. Therefore a decrease in the spending of goods and services will result in a decrease of consumption. Figure 2 shows the effect this will have upon the economy. National output decreases at first, and continues to do so with every aggregate demand, caused by the multiplier effect. This is a hazardous economic situation, one that may stem to another economic recession.

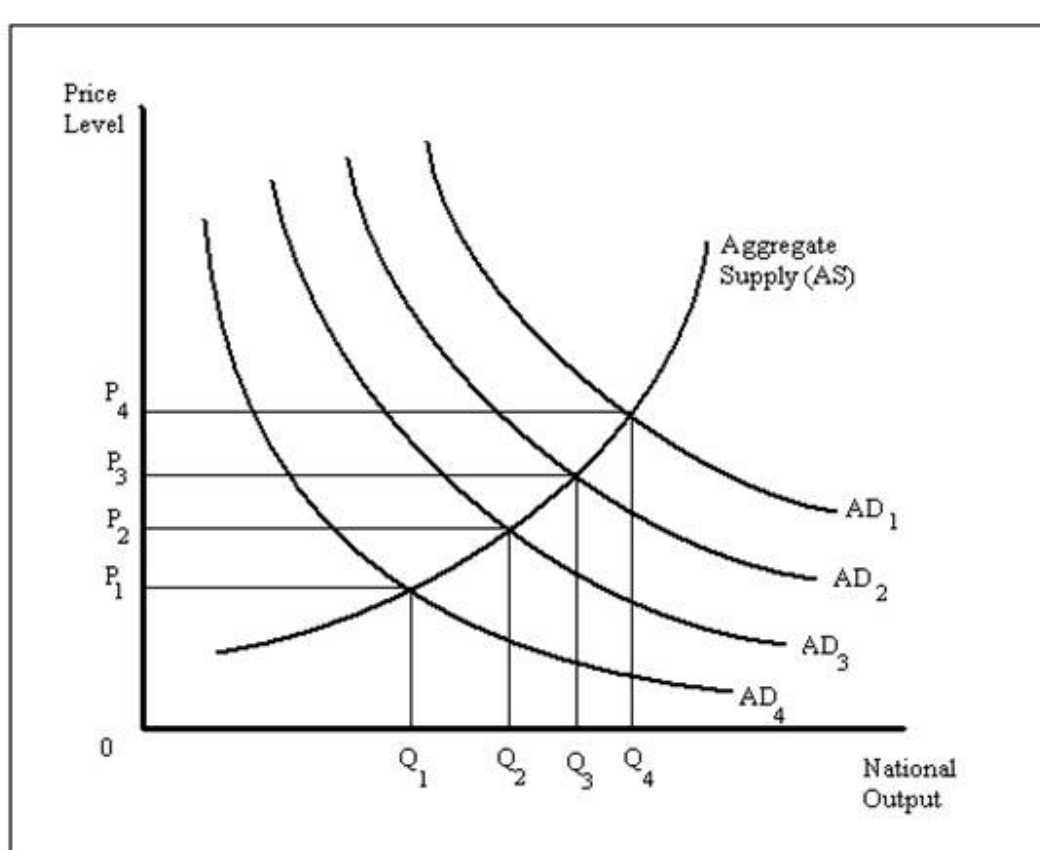


Figure 2: Decrease in aggregate demand and the multiplier effect

Installing greener industrial equipment may lower carbon emissions, but it will not completely stop it, and lowering output will still be necessary as “cutbacks in carbon emissions require some reduction in energy availability” (Cline, 1992, p.142). Cline claims this is the economic cost of reducing carbon dioxide emissions. It appears as if there is a negative relationship between being environmentally friendly and being economically optimal. This trade off is argued to be the greatest issue facing economic communities in the present era.

VI. Long Term Benefits

One may dispute that mitigation is a long term investment because if carbon emissions are not reduced socio-economic problems and financial budgetary issues will arise.

Socio-economic problems in the form of droughts and famines would be likely to increase as increasing temperatures will change rainfall patterns, leading to less water for drinking and irrigation from which “up to three billion people could suffer increased water shortages by 2080.” (http://www.direct.gov.uk/en/Environmentandgreenerliving/Thewiderenvironment/Climatechange/DG_072929). Other socio-economic problems include global temperatures rising which increases the likelihood of forest fires and droughts (Fitzroy and Papyrais, 2010, p.14) and sea level rises. An example of a socio economic problem is that of South America which relies heavily upon the Amazon rainforest, whose decline will affect industries such as the natural rubber industry which will conclude with the loss of jobs leading to widespread unemployment (<http://www.amazon-rainforest.org/economic-importance.html>).

VII. Budgetary Financial Strains

The effects of the consequences of climate change will put huge financial pressures upon governments. In December 1999 France experienced a number of volatile storms, which Brown in *Eco-Economy* states is a consequence of climate change, which destroyed millions of trees and caused \$10 billion worth of building damage (Brown, 2001, p.12). Future economies face the problem that public sector funding will suffer due to the financial support governments will have to give towards natural disasters, such as storms, flooding and forest fires. As mentioned previously, the government will either have to increase spending added to budgetary pressures or used money that would have been used for education and healthcare. This is only one example of what may occur in the future.

Although damage has already occurred, if the strategy of mitigation is not enforced then the situation for world governments and economies can only get worse.

VIII. Case Study: East Anglia

East Anglia is a region of eastern England that includes Norfolk, Suffolk and parts of Cambridgeshire and Essex. Areas such as Norfolk have a huge reliance upon agriculture, mostly due to the large amount of fertile arable land, employing 20% of the Norfolk working population.

The East Anglia coastline is argued to be the most vulnerable shoreline in the UK, where sea levels are expected to rise up to a metre in the next 100 years. This is problematic for the region as it is particularly susceptible to the effects of climate change due to large areas of soft erodable cliff and low lying land. (The Economic Implications of Climate Change in Britain, p.23). For Norfolk, the vital asset of their flat fertile lands could be its downfall. The flat lands are immediately next to the coastline, known as the Broad.

Negative effects of rising sea levels include the alteration of the freshwater ecosystem due to saline flooding to the natural environment, whilst Great Yarmouth and Norwich are at risk from flooding, putting local economies into jeopardy – see figure 3



Figure 3: Low-lying land and soft cliffs in East Anglia (Parry and Duncan, 1995, p.23)

In the 1950's, 200km of tidal embankments were built around the broads area, however they are now in a poor state and need to be replaced. If the local council decides to permit these repairs, it would require enormous funding, the opportunity cost of which would be spending upon healthcare and education. In the short term, this would be devastating for the local residents who would suffer from lack of quality of their hospitals and schools. However, in the long term, the extensive repairs would ensure flooding is avoided, whilst, boosting confidence levels ensure business areas of East Anglia are safe from flooding. One may argue that maintenance and repairs to the flood defences will always be necessary and will be a constant drain upon local financial resources. The cost of adaptation in East Anglia is high, however the costs of not maintaining the defences in the future would be enormous, leaving the region with no other option but to continue the fight against the sea.

The problem with local economies such as East Anglia is that they have no option but to adapt, mitigation is not an option. Lowering carbon emissions in the area would indeed improve the local air quality; however the effects upon avoiding sea level changes would be unnoticeable. Therefore the decision to mitigate must be carried out on a national, if not then a global level for a significant impact to be effective.

IX. Conclusion

Climate change is occurring and the world must change with it. Adaptations must be made to protect industries that rely upon national resources such as the natural rubber firms of South America, and the low laying farm lands of East Anglia. Coastal town economies are also in peril due to cliff erosion and the rising sea levels posing as a threat to people's way of life. If carbon emissions were to be immediately halted, climate change would still occur for the foreseeable future as there is a slight delay between the cause and the effect. Therefore adaptation to these effects is essential. Mitigation is also necessary as the world will not be at a financially sustainable level if carbon emissions are not lowered as it will need to constantly adapt to the never ending climate changes.

To conclude, mitigation and adaptation are vastly different strategies, however they both need to be used in order to not only save national economies from future recessions, but to save the natural and human world from physical disaster.

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