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The Interconnectivity of Economic Growth and Climate Change

In the two hundred years since the Industrial Revolution, society as we know it has been shaped and driven by economic growth and development. Only fairly recently have we as a species become aware of the great dangers posed to the environment by recklessly industrializing without a thought for its effects. Indeed, scientists have found and documented a strong connection between economic growth and climate change, but none of the current proposed policy solutions has been very effective in mitigating this effect, leading to an overall pessimistic situation moving forward.

One key factor that has led to strong economic growth is industrialization, which uses factories to mass produce products on a large and efficient scale. Factories produce a lot of air and water pollution, which damages the environment over time as it builds up. On the other hand, industrialization does lead to higher GDP and more economic activity, so there is a difficult trade off between being economically successful and trying to preserve the environment. To illustrate, it has been found that “world [economic] output has more than doubled since 1990,” yet at the same time, “global carbon dioxide (CO₂) emissions from energy use increased by about 3% per year in the 2000s, around twice the pace of the years 1981–2000” (*New Climate Economy* 1-2). Evidently, there is a positive relationship between economic growth and carbon emissions that must be addressed. Government officials and business leaders still struggle over

the best compromise that allows business to flourish without excessively adding to climate change.

Unfortunately, the matter is complicated by the fact that clean air and water are public goods, defined as goods that are non-excludable, so anyone has access to them. Since everyone *can* use them freely, everyone is going to *want* to use them, and there is no way to stop individual people or companies from doing so. The free-rider problem dictates that even if some of the large producers of pollution agree to some kind of treaty solution, others will not follow it, thereby becoming free-riders who enjoy the benefits of the treaty's effects yet continue to pollute.

Related to the free-rider problem is the Tragedy of the Commons, where a public good is used repeatedly without being maintained to the point where its value dissipates. It is often invoked in regards to situations where there is a limited amount of some natural resource, such as fish, that everyone has access to. Eventually, without restrictions, people will overfish until the abundance disappears, leading to starvation or a disruption of a steady income. This same problem can happen with the environment as factories pollute it without cleaning it up-- the clean air is the abundant resource, and factories cannot be stopped from producing carbon emissions. The emissions will soon overpower the clean air, and then everyone on Earth will be severely negatively affected, yet no one single producer can be blamed for it, since the air belongs to nobody (and yet everybody). Within individual nations, "in the absence of strong governance, natural resource abundance tends to foster problems such as corruption" (*New Climate Economy* 7), which shows the extent of the controversy over the issue of ownership of these resources.

Pollution also constitutes a negative externality, which is a cost to society that is not captured in the market price. In a nutshell, everyone living on Earth pays for the greenhouse gas byproducts of the factories. If pollution was factored into the market price, products would cost more to produce, and cost more to buy for consumers, and therefore consumers would buy fewer of those goods. Instead, factories get away with pollution in exchange for lower prices and higher revenue and profit margins. This clouds the actual issue by obscuring the true cost of pollution, since it is spread over a wide population of millions of people who feel its effects, even though they don't receive any of the benefits of the products.

There is also a connection to game theory/prisoner's dilemma: if you are a company and you believe that your competition is going to pollute, doing the same would be in your best economic interest individually, even if it's bad for the environment and the planet you have to live on. Not participating out of perceived concern for morality would be financial suicide for a business in a cutthroat world that demands only the most ruthless action. Therefore, this makes collective action and climate change legislation very difficult, because even if the United States were to enact laws for the benefit of the environment, other countries would continue to pollute just as much or even more, since it's in their best interest to grasp at any advantage they can. Then, US manufacturers would feel as though they were missing out from being held to a higher standard, and may eventually just move overseas to places where they could continue to pollute, which would be devastating to the US economy. Just like the overfishing problem, you either join in yourself or you lose out on the profits. What's more, even if several or all countries agreed to some kind of pollution-reducing treaty, some individual companies or nations may go

rogue and continue polluting without reporting it-- an additional (illegal) side effect of the free-rider problem.

All of these issues make it difficult for one policy to be an all-encompassing solution, though many have been proposed. One attempt at lowering global pollution levels uses cap-and-trade, an approach that would put a limit on how much pollution each country could produce and then allow nations to trade allowances with each other. This is an interesting idea, since some countries inevitably trade away their pollution allowances, lowering the amount they would produce, but at the same time, the large pollution countries like China and the United States still get to pollute at around the same levels. As a result, cap-and-trade probably would not do much to combat heavily polluted areas, but it would at least make some headway in reducing the global levels of emissions, and could be effective if used correctly and in conjunction with some other strategies.

Another possibility is putting an excise tax on carbon emissions to make up for the negative externalities of pollution. Ideally, this would close the gap between the market cost and the real social cost of producing the products that cause pollution. However, this would probably only lead to the cost of the tax being passed to the consumers through higher prices, due to the fact that the tax burden tends to fall on the party with the more inelastic relationship with the product. Therefore, if consumers had an inelastic demand for whatever product is getting taxed, they would end up paying the real tax themselves, defeating the point of the tax, which was to make the producers pay for the pollution that they are pushing on society as a negative externality.

While cap-and-trade and a tax on emissions are different in design, they are functionally similar. Some scholars believe that there is little difference between the two, arguing, “A carbon tax and cap-and-trade are opposite sides of the same coin,” but also admitting that “cap-and-trade has the advantage of making clear, through a market price for emissions, the actual cost of a stipulated quantity of emissions reductions” (Frank). Therefore, one or the other may be desired for different reasons in different circumstances, depending on what is needed in the situation.

Additionally, there is the idea of encouraging innovation to make production more efficient and less wasteful. While no energy source is perfect, some are less harmful than others, but they are currently more expensive to produce, which is why they have not caught up to the popularity of traditional sources. Natural gas, for example, is less harmful than traditional coal sources, but is still causing issues through fracking and the resulting groundwater pollution. Going even further, governments could encourage additional innovation by investing in clean energy such as solar and wind power, both of which are growing industries with real potential to overtake traditional coal/fossil fuel energy. Even nuclear energy has proven to be cleaner than coal, although it utilizes more dangerous materials and leads to other issues concerning the disposal of spent fuel rods and byproduct wastes. A mix of these cleaner sources could be a viable option for the future, if only governments would spend the money to invest in the technologies required.

In addition to ideas about energy solutions themselves, the government must look for new ways of enforcing those policies, due to the issues previously outlined concerning public goods and the free rider problem. In terms of getting other countries to comply with international

environmental treaties, economic sanctions would help to keep individual nations in line. If the whole point of free riding on pollution agreements is for economic gain, then they will want to avoid sanctions as much as possible. Then, peer pressure from other nations in the form of diplomacy through international organizations like the UN could help cement it so that reducing pollution would ideally become a norm across the globe.

Despite all of these possible solutions, I am very pessimistic about our ability to effectively address climate change now and in the future. Since global warming is closely tied to economic development, it seems likely that businesses will continue to pollute and destroy the environment as long as it is profitable to them. The only way to fix the problem is to change the institutions of society that make it profitable to pollute, whether that be through some kind of market solution or government intervention. Unfortunately, industries hire tons of expensive lobbyists to ensure that the government doesn't enact environmental protection laws that hurt business in any way. Furthermore, many conservative lawmakers deny that climate change even exists, let alone the fact that it is linked to human environmental activity. The current US President, Donald Trump, even once tweeted that he believed climate change to be a hoax created by the Chinese to hurt American businesses (Wong). This idea that environmental protection is merely an economic manipulation tactic is naive, dangerous, and likely to lead to apathy among US officials and their constituents. Therefore, since the government is unlikely to take new action, and the market itself does not have any revolutionary new changes in institutions, businesses will probably continue to pollute at similar or higher levels in the future with few restrictions.

To summarize, there is a tangible connection between economic growth and the output of carbon emissions that lead to climate change. Several solutions have been proposed to remedy this issue, but none have proved to be a completely effective fix. Since there is only one Earth for us to live on, we as a species must moderate our usage of natural resources and output of carbon dioxide emissions in a way that protects the environment while also allowing businesses to grow. Whether that's through a mix of the various proposed solutions, or through an entirely new solution we don't yet know about, what remains is the fact that protecting the environment should be of the utmost importance in making government and economic policy.

Works Cited

“Better Growth, Better Climate: The New Climate Economy Report.” *The Global Commission on the Economy and Climate*, 2014.

Frank, Charles. “Pricing Carbon: a Carbon Tax or Cap-and-Trade?” *Brookings Institute*, 12 August 2014.

Principles of Macroeconomics, Houston: OpenStax, 2016.

Wong, Edward. “Trump Has Called Climate Change a Chinese Hoax. Beijing Says It Is Anything But.” *The New York Times*, 18 November 2016.