A Truth or Tale: Does Climate Change Reduce Economic Growth?

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Key Points

- There is significant research highlighting how investing in climate change action technologies and infrastructure enables economic growth, compared to the inconsistent data that implies it's debilitating economic effects.

- The Organisation for Economic Co-operation and Development (OECD) revealed that the development of green infrastructure across transport, energy, heavy industries and land use industries can increase employment, and save significant funds initially spent on energy industries for example. It is also revealed to improve socio-economic outcomes related to environmental justice.

- However, given that decarbonisation goals are long-term, investing in climate action requires significant innovation. Creating decisive, low-emission, climate resilient pathways that are compatible with the Paris Agreement, is an important example of paving towards long-term decarbonisation goals.

- A combination of government and private sector efforts can drive climate action in both developed and developing nations, with leverage placed on investors to drive the demand of green technologies. For private stakeholders, this includes sustainable investing, particularly into funds that are strongly positioned towards climate action.

- The view that climate change is an economic burden, as well as that it does not reduce economic growth, can therefore be regarded as a tale: It instead fosters economic development, and has co-benefits in addressing existing socio-economic issues.

Does climate change reduce economic growth?

An empirical study by Sequeria et.al (2017) reveals that CO2 emissions or rising temperatures do not have a negative effect on GDP growth, or specifically, that there is no positive, linear relationship between CO2 emissions and global warming. However, this study also revisits its existing conclusions, highlighting its data inconsistencies across developed and developing nations as well as variations among climate regimes. As such, it illustrates how previous studies have assumed climate change as an issue that affects every nation in the same way, as well as that it's effects can only be examined through macroeconomic measures like GDP per capita. While there may be empirical evidence about how CO2 emissions have no negative impact on GDP growth, there is considerable awareness that these studies are heavily generalisable, and do not represent developing countries nor countries with completely disparate climate regimes. For example, developing nations like Sri Lanka have a predominately agricultural economy as well as a hot climate, and are thus likely to be more dramatically affected (economically) by patterns of climate change, compared to the US, a largely industrial economy. As such, it is worthwhile to look at the nuanced connectedness, rather than generalisable patterns, between climate change and economic regimes.

There's evidence that investing in climate action enables economic growth, and positive social and environmental justice outcomes

There is significant research highlighting how investing in climate change action technologies and infrastructure enables economic growth. The Organisation for Economic Co-operation and Development (OECD) [2017] revealed that the development of green infrastructure across transport, energy, heavy industries and land use industries can increase employment, and save significant funds initially spent on energy industries for example. The OECD also highlights that developing climate infrastructure has co-benefits for other SDG's including reducing air pollution, congestion, improving health and addressing certain existing socio-economic inequalities. As a result, climate action reveals significant incentive for economic as well as social growth, contradicting the tale that is often propounded by important leaders. The development of green infrastructure across transport, energy, heavy industries and land use would be vital in reducing significant greenhouse emissions given that they are emission-heavy industries. However, decarbonisation goals are long-term, and require better alignment of short-term investment strategies alongside them. Creating decisive, low-emission, climate resilient pathways that are compatible with the Paris Agreement, is an important first step towards paving long-term goals. The OECD (2017) explains the

infrastructure and technologies needed for a low-emission transition, illustrated in Figure 1:

Figure 1: Infrastructure and technologies needed for a low-emission transition.

Sourced: OCED 2017, pg.96

	Strategies		Infrastructure needs	Technologies
Transport	Improve carbon intensity of vehicles Shift to more efficient transport modes Avoid carbon intensive mobility when possible	Passenger	Charging infrastructure for electric cars and fueling infrastructure for hydrogen cars Intelligent Transport Systems Smart grids Rail Mass rapid transit systems (light rail, metro, bus rapid transit lanes) Infrastructure for walking, cycling	Electric cars Advanced biofuels and biojet (algae) for air and maritime transport Hydrogen aircrafts Batteries
		Freight	Hinterland rail infrastructure	Electrification of trucks Advanced biofuels, hydrogen for shipping Investment in agriculture research (yields)
Energy	Decarbonise the power sector Electrification of end-uses Energy efficiency	Energy and power generation	Renewable energy (wind, solar, thermal energy, tidal, waves) Smart grids Infrastructure for CO_2 transport and storage	Energy storage (thermal cycle, power to gas, batteries) Tidal, thermal energy CCS (large-scale demonstration)
		Buildings	Retrofitting of the building stock Energy-efficient new build Heat supply	Zero energy or positive energy buildings Alternative material for steel and cement
Heavy industries	Energy efficiency in industrial processes Material efficiency Capture of emissions		Energy efficiency in industrial processes Infrastructure for CO2 transport and storage	CCS (large-scale demonstration of industrial CCS applications) Hydrogen in steel making
Land use	Improve carbon sequestration by land Minimise emissions from food production, including livestocks	Negative emissions	Infrastructure for CO_2 transport and storage	CCS Direct air capture and storage BECCS (deployment at commercial scale) Biochar Ocean liming
		Agriculture	Restoration of degraded grassland	Research on yields improvements Innovative agricultural practices to improve

While these technologies require greater investment on part of the government and private stakeholders, including investors, low-emission technologies provide great incentive for economic growth through increased employment opportunities and public infrastructural use. Additionally, it is a positive medium to achieve SDG goals, like positive health and environmental justice outcomes. Studies have underscored the positive relationship between high quality public infrastructure and economy wide productivity in the long-run, particularly due to its economic efficiency.

Though investing in climate infrastructure exceeds positive economic growth, enabling improved health outcomes as well as environmental justice. Low-emission public infrastructure improves air quality which in turn improves public respiratory health, as well the mortality rates of wildlife. On the other hand, low-

emission transitions will enable communities hit more
seriously by environmental disasters, and are under-resourced, to benefit from climate action. This includes communities in greater proximity to waste zones, transport depo's and other pollution-intensive areas that heighten the health impacts of CO_2 emissions. Investing in climate action, particularly in energy industries, will enable economic growth, as well as positive health and environmental justice outcomes.

What efforts are required for climate change action?

Low-carbon, low-emission economies require reliance on new ideas, or what may be considered a "knowledge economy" to reduce reliance on raw materials and energy, boosting demand for highly educated workers and workers providing services that do not require a lot of material inputs (OECD, 2017). In developing countries, developing climate technologies and infrastructure requires a structural shift, and considerable time in the location of "knowledge economies" that are also economically viable. A combination of government and private sector efforts can drive climate action in both developed and developing nations, with leverage placed on investors to drive the demand of green technologies. For governments, this may entail policy options like green bonds, tax cuts, demand increases and economic incentives. For private stakeholders, this includes sustainable investing, particularly into funds that are strongly positioned towards climate action. The combination of efforts therefore allows climate action to be leveraged, optimising long-term goals for reducing climate change.

Our conclusions

While there is evidence that CO_2 emissions particularly, do not have a negative impact on economic growth, there is also evidence that studies like this do not wholly capture how climate change affects economies in developing nations, and nations with entirely different climate regimes. It is also evident that investing in climate action has several co-benefits, namely promoting economic growth through employment opportunities and infrastructural productivity and efficiency, as well as improving public health outcomes and environmental justice issues. The view that climate change is an economic burden, as well as that it does not reduce economic growth, can therefore be regarded as a tale: Investing in climate action yields long-term results, and thus cannot be studied through generalisable measures.

References

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