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VAHE MIKAYELYAN

*Associate Professor at the Chair of Finance, ASUE,
PhD in Economics*

 <https://orcid.org/0009-0005-7629-509X>

TATEVIK VARDANYAN

*Lecturer at the Chair of International Economics, ASUE,
PhD in Economics*

 <https://orcid.org/0000-0001-6488-2717>

NAVIGATING CLIMATE'S IMPACT ON THE WORLD ECONOMY

Climate change, a global phenomenon of paramount concern, has profound implications for the world economy. This scholarly paper thoroughly examines the many effects of climate change on the worldwide economic environment, utilizing a wide range of research and analysis.

This study examines the direct economic impacts that result from rising temperatures and severe weather occurrences. The text thoroughly analyzes the impact of climate policies, such as carbon pricing and renewable energy subsidies, by evaluating their respective expenses and advantages. Furthermore, the paper examines the economic prospects that arise when the global economy shifts towards a low-carbon model, with a particular focus on the expansion of environmentally-friendly industries and the promotion of innovation.

This paper aims to offer a comprehensive understanding of the complex correlation between climate change and the global economy. This emphasizes the immediate requirement for synchronized worldwide efforts to reduce the negative effects of climate change, while also emphasizing the economic prospects that come with moving to a more

environmentally friendly global economy. The primary objective of this study is to enhance the overall understanding of different viewpoints. One important discovery of the research is that policymakers, corporations, and individuals need to effectively handle the difficulties and possibilities arising from the changing climate conditions.

Keywords: *climate change, world economy, global emissions of carbon dioxide, carbon tax, cap-and-trade systems, renewable energy, low-carbon economy*

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Introduction: Climate change has transitioned from being a distant threat to a pressing global reality that affects every aspect of human lives. As time goes by, the effects of this phenomenon on the global economy become more noticeable, requiring a more comprehensive understanding of its complex consequences. This paper delves into the complex correlation between climate change and the global economic environment, providing a thorough analysis of this crucial matter from multiple viewpoints.

The imperative to tackle climate change stems from its extensive ramifications. This phenomenon surpasses geographical boundaries, exerting an influence on global economic systems, markets, industries, and society at a large. In our highly interconnected world the impacts of climate change are not isolated occurrences but rather a complex network of interdependencies, necessitating a holistic consideration of its repercussions.

This paper highlights the complex and urgent connection between climate change and the global economy. This underscores the necessity for synchronized international efforts to reduce the effects of climate change, while also emphasizing the economic opportunities that arise from transitioning to a more environmentally friendly global economy. Amidst the changing circumstances, it is crucial for politicians, businesses, and individuals to have a detailed comprehension of these intricacies in order to effectively address the unprecedented challenges and prospects presented by climate change.

Literature review: The intricate interplay between climate change and the global economy has been a subject of extensive scrutiny by a diverse array of theorists, analysts, researchers, and policymakers for an extended period. This paper delves into a selection of studies and scholarly works that illuminate the intricate relationship between climate change and the global economy. These discussions encompass a thorough examination of the various challenges that have emerged from research in this field and the potential avenues for their resolution.

In the realm of professional literature, there exists a substantial body of analyses and research on this topic. The impact of climate change on the world economy spans across multiple sectors and is characterized by its comprehensive nature. Consequently, our examination of professional literature suggests that exploring this body of knowledge along with specific targeted avenues is advantageous for a more nuanced understanding.

1. *Economic impacts of climate change*

A comprehensive examination of the economic ramifications of climate change is imperative to gauge its influence on the global economy. In their work, Smith and Jones conducted a meticulous review and analysis of existing literature pertaining to the economic consequences of climate change. Their study amalgamated diverse research findings, shedding light on various areas of concern in relation to climate change impacts, specifically in sectors like agriculture, energy, and infrastructure.

Smith and Jones¹ highlight the particular vulnerability of agricultural systems to climate change, noting such phenomena as diminished crop yields and heightened susceptibility to pests and diseases. Additionally, their research accentuated the potential disruption of water resources and the increased frequency of extreme weather events, with both having significant economic consequences.

Alterations in temperature and precipitation trends have the potential to disturb agricultural output, resulting in diminished yields and elevated food costs². Furthermore, extreme weather occurrences can inflict harm upon infrastructure, disrupt logistical networks, and impose financial strains on both enterprises and governmental bodies³.

In the book entitled "The Economics of Climate Change," Stern provides an in-depth exploration of the economic implications of climate change⁴. He places significant emphasis on the urgency of taking immediate action to mitigate risks and conducts a thorough cost-benefit analysis of different policy measures.

Additionally, a report released by the Intergovernmental Panel on Climate Change in 2018 offers a comprehensive evaluation of the ramifications of global warming. This report presents substantial evidence regarding the economic fallout of climate change, underscoring the perils it poses to both livelihoods and ecosystems⁵.

2. *Sectoral perspectives*

Climate change exerts differing levels of vulnerability across various sectors of the economy. For instance, the tourism industry confronts a multitude of challenges resulting from shifts in climatic conditions. Numerous research endeavors have explored the effects of climate change on tourism, encompassing alterations in travel behaviors, shifts in popular destinations, and heightened risks to coastal tourism infrastructure. These studies have unveiled a spectrum of developmental prospects for the tourism sector, with outcomes ranging from

¹ Smith, J., & Jones, A., "Economic impacts of climate change: a comprehensive review. *Journal of Environmental Economics and Policy*", 10(4), 2018, 470-486.

² Stern, N., "The economics of climate change", *American Economic Review*, 2021, 107(5), 277-281

³ Intergovernmental Panel on Climate Change, Summary for policymakers. In *Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways*, 2018

⁴ Stern, N., "The economics of climate change. *American Economic Review*", 107(5), 2021, 277-281.

⁵ Intergovernmental Panel on Climate Change, Summary for policymakers. In *Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways*, 2018

adverse to advantageous, contingent upon the geographic locations of destinations and their adaptability potential⁶.

Within the energy sector, climate change exerts far-reaching effects on the realms of energy generation, distribution, and consumption. From one viewpoint, a transition towards renewable energy sources holds the potential to serve as a dual-purpose strategy, facilitating both climate change mitigation and fostering economic growth. Acemoglu and collaborators have provided empirical evidence showcasing how investments in renewable energy technologies can act as catalysts for economic advancement, simultaneously generating new employment opportunities.

Nonetheless, this transition also entails certain drawbacks and obstacles, including the imperative for substantial infrastructure investments and the possible displacement of jobs within traditional energy sectors⁷.

3. Regional disparities

The consequences of climate change are not evenly distributed across different regions, leading to notable disparities. Nordhaus conducted a comprehensive assessment of the regional economic repercussions of climate change, employing an integrated assessment model. The analysis reveals that specific regions, particularly those situated farther from the equator, could potentially benefit from milder winters and increased agricultural productivity. Conversely, regions in closer proximity to the equator encounter more substantial challenges, such as decreased agricultural yields and heightened susceptibility to extreme weather events⁸.

Moreover, regional vulnerabilities and adaptation strategies significantly influence the economic ramifications of climate change. Thus, nations characterized by lower economic development levels and limited resources may confront greater difficulties in adapting to the impacts of climate change. A team of researchers explored the economic consequences of climate change on small island developing states, shedding light on their vulnerabilities and constrained capacities in dealing with these challenges⁹.

4. Macroeconomic perspectives

Climate change possesses the capacity to trigger macroeconomic repercussions that impact such key indicators as GDP, employment rates, inflation, and public finances, among various socio-economic metrics. Stern conducted an extensive examination of the economic aspects of climate change, emphasizing the potential economic disturbances and risks attributed to it. These encompass disruptions to global supply chains, declines in labor productivity, and heightened healthcare expenditures. This analysis underscores the

⁶ Gössling, S., Scott, D., Hall, C., M., "Tourism and Climate Change. Impacts, Mitigation and Adaptation", January 2012, Publisher: Routledge

⁷ Acemoglu, D., Claire, L., Pascual, R., "Competing with Robots: Firm-Level Evidence from France", AEA Papers and Proceedings, 110, 2020, 383-88.

⁸ Nordhaus, W., "Integrated Assessment Models of Climate Change", <https://www.nber.org/reporter/2017number3/integrated-assessment-models-climate-change>

⁹ Adger, W.N., Crépin, A.S., Folke, C., Ospina, D., Chapin III, F.S., Segerson, K., Seto, K.C., Anderies, J.M., Barrett, S., Bennett, E.M., Daily, G. et al., "Urbanization, Migration, and Adaptation to Climate Change", One Earth 3(4), 2020, 396-399.

imperative for proactive policy measures aimed at mitigating these risks and fostering a trajectory of sustainable economic growth¹⁰.

5. Policy interventions

Effectively addressing the consequences of climate change on the global economy necessitates the formulation and execution of precise and targeted policies, both at the national and global levels. One such instrumental approach is the adoption of carbon pricing, which can serve as a mechanism for curbing emissions. Stavins conducted an examination of the design and execution of carbon pricing mechanisms, encompassing carbon taxes and emissions trading systems¹¹.

In essence, a comprehensive literature review on the impact of climate change on the global economy encompasses a diversity of viewpoints and stances. In a broader context, these studies collectively underscore the substantial economic ramifications of climate change, extending their reach across diverse sectors, geographic regions, and macroeconomic indicators. These economic consequences span from disruptions in agricultural and water resources to sector-specific challenges, such as those faced by tourism and energy. The implementation of policies and targeted initiatives in these pertinent domains stands as a principal approach for surmounting the hurdles posed by climate change.

Research methodology: The theoretical and methodological framework of this paper draws extensively from international economists and researchers, encompassing classical and contemporary economic theories related to the intricate relationship between climate change and the global economy. Additionally, insights are derived from reports and strategic programs of governmental bodies, in conjunction with reports from both state and private organizations. Key sources of data include publications from authoritative international organizations such as the World Bank, UN, International Energy Agency, and the Swedish Re Institute.

Quantitative methods form the backbone for statistical analyses that provide answers to critical research inquiries. The primary situational analysis relies on quantitative approaches, utilizing statistical tools to analyze datasets from reputable sources. The quantitative analysis includes an examination of trends in global temperature, carbon dioxide emissions, and economic indicators. The specific tools employed in the quantitative analysis include trend analysis, growth rates calculation, and comparative assessments.

Qualitative methods complement the quantitative analyses, offering depth to the understanding of the multifaceted impact of climate change on the global economy. Observations and content analysis are instrumental in exploring the nuanced aspects of the relationship between climate change and economic

¹⁰ Stern, N., "The economics of climate change", American Economic Review, 2021, 107(5), 277-281

¹¹ Stavins, R., "The Future of U.S. Carbon-Pricing Policy", National Bureau of Economic Research, 1050 Massachusetts Avenue, Cambridge, MA 02138, May 2019, https://www.nber.org/system/files/working_papers/w25912/w25912.pdf

dynamics. The qualitative approach involves an in-depth examination of case studies, stakeholder perspectives, and the role of climate policies.

In the sphere of economic theory, this study adopts the historical-deductive method to comprehensively understand the interplay between climate change and the global economy. The historical-deductive method, embraced by classical and Keynesian economists, involves an examination of historical data and events to derive insights into the causal relationships between climate change and economic phenomena. This method allows for a nuanced understanding of how past events have shaped current economic dynamics.

While the historical-deductive method is the primary approach, elements of the hypothetical-deductive method are also incorporated to strengthen the analytical framework. The hypothetical-deductive method, favored by neoclassical economists, enables the derivation of mathematically rigorous theories from foundational assumptions. This inclusion ensures a balanced approach, acknowledging both theoretical rigor and practical relevance.

In summary, this paper employs a dual-pronged research methodology, integrating quantitative and qualitative approaches, as well as historical-deductive and hypothetical-deductive methods. This multifaceted approach aims to provide a comprehensive and nuanced examination of the complex relationship between climate change and the world economy, addressing the comments on the need for clarity in qualitative and quantitative tools and a more explicit definition of the research goal.

Analysis: Climate change is a significant and current challenge that is causing major changes to the global economy, the full consequences of which are not yet completely understood. Occurrences like as severe floods in China and Germany, as well as destructive wildfires and hurricanes in the US, illustrate the range of climate change phenomena and their occasionally terrifying outcomes.

Evaluating the influence of climate change on the worldwide economy is a daunting task due to the inherent ambiguity and unpredictability linked to both the occurrence of global warming and its subsequent effects. On one hand, the data that record the planet's warming offer valuable information about possible adverse outcomes. However, the progress of contemporary technology and its potential provide a ray of hope in tackling the issues presented by global warming.

The data presented in Figure 1 indicates that from 1880 to 2022, the Earth's temperature had an average rise of 0.06°C . Specifically, the temperature in 2022 was recorded at 0.89°C , while it was -0.17°C in 1880¹². Based on data from the National Oceanic and Atmospheric Administration, the Earth's global surface temperature in 2022 was the sixth highest since records began in 1880. According to the National Center for Environmental Information, the hottest ten years in the past 143 years have all taken place after 2010. Specifically, the nine years from 2014 to 2022 have been the warmest on record. The slight rise in numbers highlights the significant effect on ecosystems, requiring creative

¹² <https://climate.nasa.gov/vital-signs/global-temperature/>

approaches to tackle the wider consequences for agriculture, biodiversity, and water supplies¹³.

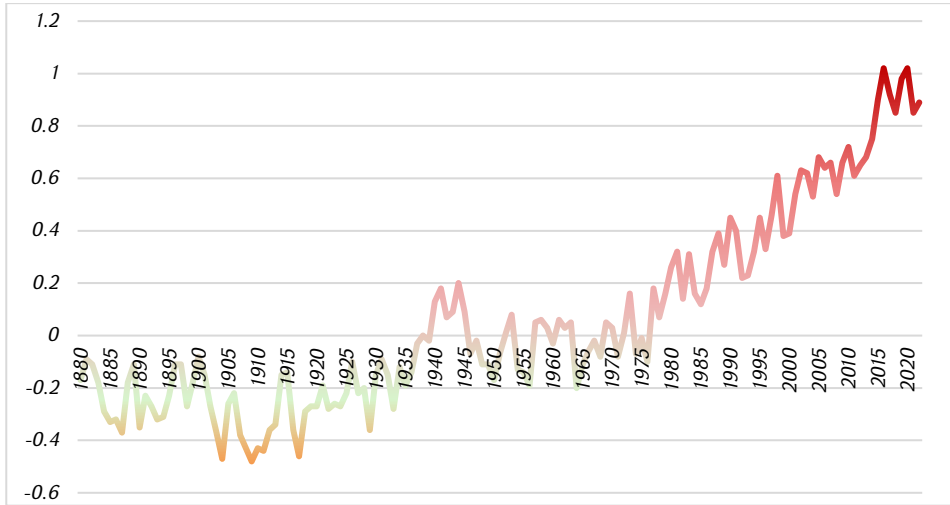


Figure 1. Earth’s surface temperature (Celsius scale)¹⁴

Given the vast size and ability of Earth's oceans to absorb heat, a significant amount of heat energy is necessary to raise the planet's average yearly surface temperature, even by a small amount. The worldwide average surface temperature has increased by around 2 degrees Fahrenheit (equal to approximately 1 degree Celsius) during the pre-industrial period (1880-1900). While this may seem little, it represents a significant increase in collected heat. There is a clear and continuous increase in global temperatures, which has a profound impact on ecosystems and weather patterns. The increasing temperatures indicate a greater need for adaptable tactics and new ways in several industries to reduce potential economic disruptions.

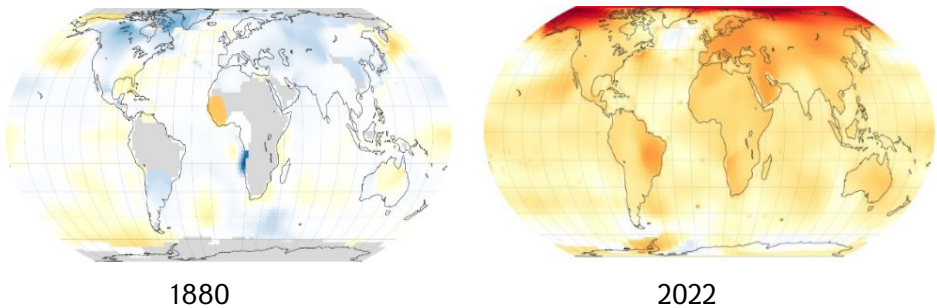


Figure 2. Comparison of Surface Maps: 1880 vs. 2022

The images shown in Figure 2 clearly illustrate the effects of global warming on the Earth's surface. The implications include severe temperatures in specific regions and seasons, a decrease in snow cover and sea ice, increased levels of

¹³ <https://www.ncei.noaa.gov/access/monitoring/monthly-report/global/202213>

¹⁴ <https://climate.nasa.gov/vital-signs/global-temperature/>

precipitation, and changes in habitats for plants and animals, which could lead to the extinction of certain species.

Nevertheless, it is crucial to acknowledge that the Earth displays an extensive spectrum of temperatures, characterized by a 55°C disparity between its highest and lowest regions. Moreover, temperatures exhibit variations between day and night, as well as throughout the different seasons in both the northern and southern hemispheres. As a result, specific areas undergo severe cold temperatures, while others suffer from intense heat. Recurrent and severe extreme weather phenomena provide immediate hazards to infrastructure and disrupt worldwide supply chains. The vulnerability of our infrastructure to extreme events emphasizes the necessity for investments and strategic planning that prioritize climate resilience in order to protect economic stability.

In summary, the data presented in Figure 3 clearly show that the average annual growth rate of carbon dioxide emissions from 1961 to 2021 was around 2.3%. When comparing the years 1961 and 2021, we observe a substantial increase in emissions of roughly 294.1%, resulting in a stunning total of 37,123,850 thousand tons in 2021. Simultaneously, throughout the same time of observation, the average yearly growth rate of the worldwide population remained stable at approximately 1.6%.

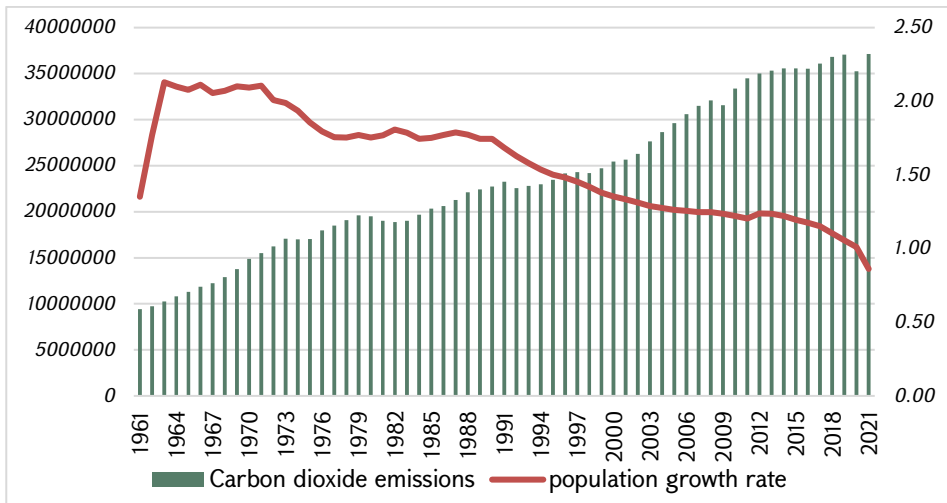


Figure 3. Global emissions of carbon dioxide (thousand tons) and annual growth rate of world population (%)¹⁵

Recent research conducted by the Swedish Re Institute suggests a significant possibility of a 10% decline in the world economy's value by the year 2050. This alarming possibility becomes more likely if we do not comply with the goals stated in the Paris Agreement, which includes the vital objective of reaching complete elimination of carbon dioxide emissions by 2050¹⁶.

¹⁵ The World Bank Database: <https://data.worldbank.org/indicator>

¹⁶ The Swedish Re Institute “The economics of climate change” <https://www.swissre.com/institute/research/topics-and-risk-dialogues/climate-and-natural-catastrophe-risk/expertise-publication-economics-of-climate-change.html>

Projections suggest that there may be economic downturns by 2050 if catastrophic climate change scenarios occur. These estimates highlight the necessity of taking proactive actions, emphasizing the development of novel economic models that achieve a harmonious equilibrium between growth and environmental sustainability.

Assessing the repercussions of climate change poses a complex and difficult task, mainly because of the uncertainties regarding the magnitude of future global warming and its subsequent impact on global activity. Clearly, when the Earth's temperature increases, there are both positive and negative aspects to take into account. Furthermore, we need to consider the inherent uncertainty of technological progress and its potential to alter the course of global warming. In addition, any assessment requires the adoption of a long-term viewpoint that goes beyond the usual timeframe used by financial market players.

However, the rising awareness of this matter has resulted in an escalating need for input from shareholders who have apprehensions over the ecological consequences of the companies they have invested in. They also have concerns on the potential impact of climate change on the value chain of these enterprises, or a possible combination of these issues.

Based on the study undertaken by the Swedish Re Institute, the estimated effects on global GDP by 2050 differ greatly depending on different climate change scenarios, compared to a hypothetical world without climate change. These scenarios encompass:

- a staggering 18% reduction in global GDP if no substantial mitigating measures are enacted, resulting in a substantial 3.2°C increase in global temperatures,
- a 14% decrease in global GDP when some mitigating actions are undertaken, resulting in a 2.6°C temperature increase,
- an 11% reduction in global GDP when additional mitigating actions are implemented, curbing temperature rise to 2°C,
- a more modest 4% decline in global GDP if the objectives of the Paris Agreement are effectively met, maintaining global warming below a 2°C increase threshold¹⁷.

These estimates highlight the crucial importance of taking measures to prevent serious economic effects linked to climate change and emphasize the economic value of following international climate agreements like the Paris Agreement.

Under a severe climate change scenario, the economic consequences are expected to have a particularly significant effect on Asian economies. China, for example, is confronted with the formidable possibility of losing almost 24% of its Gross Domestic Product (GDP). Meanwhile, the United States, being the largest global economy, is likely to face significant economic downturns, amounting to around 10%. In a similar vein, it is anticipated that European economies will face

¹⁷ The Swedish Re Institute “World economy set to lose up to 18% GDP from climate change if no action taken, reveals Swiss Re Institute's stress-test analysis” <https://www.swissre.com/media/press-release/nr-20210422-economics-of-climate-change-risks.html>

significant economic consequences, with a projected decrease of almost 11% in their Gross Domestic Product (GDP).

These estimates highlight the extensive economic susceptibility caused by climate change, with Asia, the United States, and Europe all facing substantial difficulties in protecting their economic prosperity. Therefore, it is crucial for these regions and the global society as a whole to take proactive actions in order to reduce the negative effects of climate change and guarantee the strength and adaptability of their economy in response to this urgent worldwide problem (the Swiss Re Institute, 2021).

The Swiss Re Institute conducted a thorough analysis that examined two important aspects: the susceptibility of individual nations to extreme dry and wet weather conditions, and their ability to effectively manage the consequences of climate change. These two factors were combined to create a ranking system designed to assess the overall ability of countries to withstand the effects of climate change.

The final ranking closely aligns with the findings of the GDP impact analysis. Specifically, it uncovers a significant association between countries experiencing the most severe economic repercussions and those having the least amount of resources and ability to adjust to and alleviate the impacts of the rising global temperatures. Within this particular framework, the countries that have the most significant degrees of susceptibility are Malaysia, Thailand, India, the Philippines, and Indonesia. This emphasizes the considerable obstacles they face in dealing with dangers associated with climate change.

In contrast, advanced economies situated in the northern hemisphere, such as the United States, Canada, Switzerland, and Germany, are identified as the least susceptible nations in this evaluation. The contrast highlights the significant differences in the ability of nations to withstand and recover from challenges, emphasizing the urgent need for global collaboration and support systems to help the least protected countries in effectively dealing with and reducing the various effects of climate change. Pinpointing particular vulnerabilities enables customized actions and underscores the significance of international support structures for the nations that are most severely affected. The paper highlights the necessity of diplomatic efforts and international collaboration frameworks that surpass existing geopolitical obstacles, with a particular emphasis on the influence of economic incentives in promoting cooperation.

An essential aspect of comprehending how governments and institutions are tackling the issues of climate change involves analyzing the impact of climate policies, such as carbon pricing and renewable energy subsidies, and evaluating their possible advantages and disadvantages. The objective of these policies is to decrease the release of greenhouse gases, encourage the development of sustainable energy sources, and alleviate the consequences of climate change.

Carbon pricing mechanisms, such as carbon tax and cap-and-trade systems, play a crucial role in the complex realm of climate policies. These mechanisms are designed to encourage the reduction of greenhouse gas emissions, finance sustainability projects, and guide economies towards a future with lower carbon emissions.

A carbon tax functions by levying a charge on the carbon content of fossil fuels, thus incorporating the external expenses linked to carbon emissions. It effectively communicates an economic message to individuals and businesses, motivating them to reduce their carbon emissions. Crucially, the income generated from carbon tax can be used towards government programs specifically aimed at environmental initiatives, the advancement of renewable energy, and other efforts to promote sustainability. Moreover, governments can employ these funds to offer incentives for reducing emissions, thereby promoting the development of innovative clean technology and practices¹⁸. The persistent increase in carbon emissions is a problem, highlighting the continuous difficulty of separating economic expansion from activities that produce high levels of carbon. This highlights the urgent requirement for policies that not only restrict emissions but also promote sustainable economic growth, moving away from activities that produce high levels of carbon.

Conversely, cap-and-trade systems adopt a market-based strategy for decreasing emissions (The World Bank)¹⁹. A predetermined limit is established for overall emissions, guaranteeing that emissions do not go beyond a preset threshold. Under this system, permits are either assigned or sold to companies, giving them the authority to release a specific amount of greenhouse gases. The distinguishing feature of cap-and-trade is the ability to exchange these licenses between corporations. This adaptability promotes the reduction of emissions by enabling entities with a higher cost-effectiveness in emissions reduction to sell their excess permits to others. As a result, this market mechanism encourages a decrease in emissions overall, while also offering a financial motivation for adopting environmentally friendly habits.

Implementing carbon pricing methods presents inherent obstacles. Detractors contend that the implementation of carbon taxes could lead to escalated expenses for both consumers and enterprises, thereby exerting an influence on economic expansion. Likewise, cap-and-trade systems necessitate meticulous planning and management to thwart market manipulation and guarantee fair emission reductions.

However, the advantages of these programs are significant. Carbon pricing schemes are essential for facilitating the shift of economies towards sustainability, promoting innovation, and fulfilling international climate obligations. The Paris Agreement serves as a prime example of regulations that highlight the worldwide acknowledgment of the pressing necessity to reduce emissions and alleviate the effects of climate change. Carbon pricing systems are essential in climate policy as they play a crucial role in promoting both environmental sustainability and economic growth, therefore paving the way towards a sustainable future.

Governments globally have acknowledged the pressing necessity to shift from fossil fuels to renewable energy sources in order to address climate change and guarantee sustainable energy stability in the long run. To achieve this shift, governments utilize various financial incentives and subsidies to promote the

¹⁸ <https://www.worldbank.org/en/programs/pricing-carbon>

¹⁹ <https://carbonpricingdashboard.worldbank.org/about>

development of renewable energy technologies, including wind, solar, and hydroelectric power. Subsidies for renewable energy, such as tax credits, feed-in tariffs, and grants, have a significant impact on the direction of renewable energy growth²⁰.

Renewable energy subsidies provide the potential to expedite the shift towards sustainable energy sources, but they are not devoid of intricacies and objections. Critics contend that subsidies can impose a financial strain on public funds and raise concerns about their long-term viability. Nevertheless, advocates argue that the environmental, economic, and social advantages of providing financial support for renewable energy surpass the associated expenses.

Renewable energy subsidies have a dual impact: they decrease greenhouse gas emissions and also promote employment growth, bolster energy security, and diminish dependence on fossil fuels. They have a role in expanding the variety of energy sources and reducing the negative environmental effects linked to traditional energy generation. Renewable energy sources, such as solar and wind power, generate electricity without releasing any greenhouse gases during their operation. Through the provision of subsidies, governments incentivize the adoption of these technologies, so facilitating a transition away from fossil fuels and resulting in a significant reduction in overall greenhouse gas emissions. Subsidies for renewable energy encourage the use of greener technology, which helps in the worldwide endeavor to address climate change by reducing emissions. The renewable energy industry necessitates proficient laborers for the production, installation, upkeep, and research and development processes. Subsidies foster expansion in this industry, resulting in the generation of employment opportunities. The growth of the renewable energy sector creates employment prospects for individuals with a diverse skill set, including engineers, technicians, researchers, and project managers. Introducing renewable sources into the energy mix decreases reliance on limited fossil fuels, hence reducing the risks associated with their geopolitical and supply-related uncertainties. Renewable energy subsidies enhance the robustness and reliability of the energy infrastructure by encouraging the utilization of various energy sources. This reduces the vulnerability to disruptions in the supply chain of fossil fuels. Subsidies for renewable energy promote the shift towards wind, solar, and hydropower, reducing dependence on fossil fuels that are limited in supply, prone to price fluctuations, and linked to environmental and geopolitical hazards. The objective is to establish a self-sustaining energy ecosystem that minimizes reliance on fossil fuels, thereby addressing the economic and environmental hazards associated with their extraction, transportation, and burning. Subsidies facilitate the incorporation of various renewable energy sources into the energy system, ensuring a consistent and robust power supply. Diversification reduces dependence on a single energy source, hence improving the overall resilience and flexibility of the energy system in response to different conditions and requirements. Renewable sources of energy offer lesser environmental

²⁰ Renewables Now, “Global Overview” https://www.ren21.net/gsr-2021/chapters/chapter_01/chapter_01/

consequences, including reduced air and water pollution as well as habitat damage, when compared to conventional energy production methods. Subsidies are essential in expediting the uptake of cleaner energy technologies, therefore reducing the negative environmental impacts linked to traditional energy generation.

The shift towards a low-carbon economy signifies a substantial change in our methods of energy and resource production and use. Despite the difficulties it presents, this transition also presents substantial economic prospects, particularly in the expansion of environmentally-friendly sectors and the promotion of inventive thinking. The renewable energy industry, encompassing solar, wind, and hydroelectric power, has experienced rapid and significant expansion. Investments in renewable energy projects have the potential to create employment opportunities, boost local economies, and foster technological progress as nations work towards achieving their clean energy objectives²¹. The emergence of Electric Vehicles (EV) signifies a highly promising and environmentally friendly sector. Governments are providing financial incentives and investing in the construction of infrastructure to encourage the adoption of electric vehicles (EVs). This support is driving advancements in battery technology and the manufacturing of electric vehicles²². The green agricultural sector is experiencing expansion due to the implementation of sustainable farming methods and precision agriculture technologies. These advancements augment the efficiency of resource utilization, diminish emissions, and enhance the productivity of agricultural crops²³. The shift towards a low-carbon economy has stimulated advancements in clean technology, such as energy-efficient architectural concepts, intelligent power distribution networks, and carbon capture and storage (CCS) systems²⁴. These advancements generate fresh markets and prospects for employment. The adoption of a circular economy framework, which prioritizes recycling, reusing, and minimizing waste, stimulates inventive approaches in creating sustainable product designs and materials. This strategy aims to reduce resource use and mitigate environmental effect, as stated by The Ellen MacArthur Foundation²⁵. The analysis uncovers possibilities for promoting innovation and generating employment within these sectors, offering a plan for long-lasting economic expansion.

Ultimately, the need to shift towards a low-carbon economy is not solely a reaction to environmental difficulties, but rather a strategic route to achieve

²¹ UN “Global Trends in Renewable Energy Investment 2020”

<https://wedocs.unep.org/handle/20.500.11822/32700>

²² International Energy Agency, “Global EV Outlook 2021 Accelerating ambitions despite the pandemic”,

<https://iea.blob.core.windows.net/assets/ed5f4484-f556-4110-8c5c-4ede8bcba637/GlobalEVOutlook2021.pdf>

²³ <https://www.fao.org/sustainability/en/>

²⁴ International Energy Agency, “Energy Technology Perspectives 2020, Special Report on Clean Energy Innovation”,

https://iea.blob.core.windows.net/assets/04dc5d08-4e45-447d-a0c1-d76b5ac43987/Energy_Technology_Perspectives_2020_-_Special_Report_on_Clean_Energy_Innovation.pdf

²⁵ The Ellen MacArthur Foundation, “Circular Economy”,

<https://ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview>

economic expansion and foster innovation. This transition has accelerated the rise and growth of environmentally friendly industries, fueled by a strong surge in environmental consciousness and strong regulatory backing. Concurrently, it has emerged as a catalyst for originality, sparking a surge of inventive resolutions in diverse fields as companies and industries adjust to the evolving requirements of a dynamic world. Several nations adopt climate policies, such as the implementation of carbon pricing and the provision of subsidies for renewable energy. While recognizing the collective endeavors on a global scale, it is imperative to develop policy frameworks that take into account the distinct economic conditions of various regions, with the aim of fostering inclusivity and maximizing efficacy.

The thriving green sectors, encompassing renewable energy, electric vehicles, sustainable agriculture, and other related fields, have demonstrated their environmental advantages as well as their economic profitability. Investments in these sectors yield employment opportunities, invigorate both local and global economies, and promote technological progress that has a widespread impact on other industries. The green sectors have transitioned from being specialized to being significant catalysts for global economic development. Economic sectors encounter a range of effects, such as altered agricultural seasons, limited water availability, and interruptions in the flow of goods and services. The diverse effects require policies tailored to each sector, emphasizing the significance of industrial cooperation and ingenuity in adjusting to changing climate circumstances.

In response to the challenges presented by the shift towards a low-carbon economy, innovation is also flourishing. The period of transformational innovation is characterized by the prominent presence of clean technologies, circular economy models, and climate finance methods. They not only optimize the use of resources but also provide new markets and opportunities for entrepreneurship and investment.

Businesses, politicians, and individuals must acknowledge and utilize the significant economic opportunities that come with transitioning to a low-carbon economy. To achieve both economic prosperity and environmental sustainability, we can adopt sustainable practices, invest in green technologies, and advocate for regulations that promote environmental stewardship. This trip is crucial and morally necessary for a society that is closely connected to the goal of achieving a sustainable future. In this future, economic progress and environmental protection come together to guarantee the well-being of both present and future generations.

Conclusions: The combination of literature and research highlights the significant dangers and difficulties presented by climate change to the worldwide economy, affecting various industries and locations in different ways. Immediate, synchronized measures are crucial to alleviate these consequences and promote sustainable economic growth. Key measures encompass implementing policy interventions with climate-friendly legislation, fostering innovation, and

enhancing international cooperation to bolster resilience and mitigate possible economic disruptions stemming from climate change.

The research undertaken by the Swedish Re Institute emphasizes notable economic hazards linked to climate change, forecasting considerable decreases in world GDP across several climate scenarios. These forecasts highlight the crucial significance of taking measures to reduce the impact and meet global climate goals, particularly those outlined in the Paris Agreement.

Furthermore, the evaluation of nations' susceptibility and ability to recover highlights a harsh truth - countries most adversely impacted often lack the resources to adapt and alleviate these consequences. This highlights the necessity for worldwide unity and assistance systems to successfully aid the most susceptible nations in tackling climate change.

Handling climate change necessitates a thorough and synchronized endeavor from governments, corporations, and individuals on a global scale. The implications have a wide-ranging impact, not limited to the environment, but also affecting the economic, social, and geopolitical aspects. A comprehensive understanding of these intricacies is essential for making well-informed decisions in a world affected by climate change. It is imperative for the international community to take prompt and resolute actions to reduce risks and take advantage of the opportunities that arise from transitioning to a more sustainable and resilient global economy.

The introduction of carbon pricing mechanisms poses a significant challenge, as detractors raise worries about the potential economic consequences and intricacies of the market. However, the significant advantages of these policies, such as the promotion of sustainability, driving innovation, and fulfilling international climate pledges, highlight their crucial role in tackling urgent environmental concerns. Carbon pricing systems are essential components of climate policy, providing a means to effectively address environmental concerns while promoting sustainable economic development and resilience.

Renewable energy subsidies are becoming powerful instruments in the worldwide endeavor to address climate change and accomplish a sustainable energy future. Governments have a crucial role in offering monetary rewards to encourage the use of renewable energy technologies. This helps to shape the energy industry, stimulate new ideas, and support the shift towards cleaner and more robust energy systems. Nonetheless, it is crucial to prioritize meticulous planning, open and accountable management, and regular assessment of these financial aids in order to optimize their impact and guarantee a viable energy future for everyone.

Upon contemplation, the shift towards a low-carbon economy goes beyond being environmentally necessary; it serves as a driving force for economic prospects and groundbreaking advancements. The green industries are flourishing due to increased awareness and progressive regulations, while innovation is prevalent in sectors that are adjusting to a changing world. The primary discovery of this paper resides in the identification and utilization of this economic capacity. This imperative seeks to harmonize economic prosperity and

environmental care, so establishing a path towards a sustainable future that benefits both present and future generations.

In the future, if we don't take strong and rapid measures, there could be increasingly severe economic and environmental implications, which would require a more extensive set of laws and actions. The policies outlined, although essential, may necessitate enhancement and a more comprehensive range of measures to address the severe challenges that lie ahead. This emphasizes the urgent requirement for continuous research, innovative policy measures, and a worldwide dedication to tackle the intricate and interrelated challenges presented by climate change.

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ՎԱՇԵ ՄԻՔԱՅԵԼՅԱՆ

*ՀՊՏՀ ֆինանսների ամբիոնի դոցենտ,
 ԿնԿԵՍԱԳԻՐՈՅԻՅԱՆ ԹԵԿՆԱԾՈՒ*

ՏԱԹԵՎԻԿ ՎԱՐԴԱՆՅԱՆ

*ՀՊՏՀ միջազգային ԿնԿԵՍԱԿԱՆ ԽԱՐԱԲԵՐՈՅՈՒՆՆԵՐԻ
 ԱՄԲԻՈՆԻ ՂԱՍԱԽՈՍ, ԿնԿԵՍԱԳԻՐՈՅԻՅԱՆ ԹԵԿՆԱԾՈՒ*

Կլիմայի փոփոխության ազդեցությունը համաշխարհային ԿնԿԵՍՈՅԻՅԱՆ ՎՐԱ.– Կլիմայի փոփոխությունը մտահոգիչ գլոբալ գործընթաց է, որը մի շարք բացասական հետևանքներ է թողնում նաև համաշխարհային տնտեսության վրա: Այս հոդվածի շրջանակներում իրականացվել է համաշխարհային տնտեսության վրա կլիմայի փոփոխության բազմակողմանի ազդեցության համապարփակ ուսումնասիրություն:

Վերլուծվել են կլիմայի փոփոխության տնտեսական հետևանքները, որոնք առաջանում են ջերմաստիճանի բարձրացումից և եղանակային ծայրահեղ պայմաններից: Հողվածում հանգամանորեն ուսումնասիրվել է կլիմայական քաղաքականության ազդեցությունը, ներառյալ՝ ածխածնի գնագոյացումը և վերականգնվող էներգիայի սուբսիդիաները, միաժամանակ գնահատվել են դրանց հարակից ծախսերն ու օգուտները: Ավելին, հողվածում դիտարկվում են տնտեսական հնարավորությունները, որոնք առաջանում են, երբ աշխարհն անցում է կատարում դեպի ցածր ածխածնային տնտեսություն՝ ընդգծելով կանաչ արդյունաբերության աճը և խթանելով նորարարությունը:

Ընդհանուր առմամբ, հողվածում բացահայտվել են կլիմայի փոփոխության և համաշխարհային տնտեսության միջև բարդ փոխառնչությունները: Ընդգծվել է համակարգված գլոբալ գործողությունների հրատապությունը՝ մեղմելու կլիմայի փոփոխության անբարենպաստ ազդեցությունները՝ միաժամանակ կարևորելով ավելի կայուն գլոբալ տնտեսության անցնելու անհրաժեշտ տնտեսական հնարավորությունները: Որպես հիմնական եզրահանգում՝ հողվածում շեշտվել է քաղաքականություն մշակողների, բիզնեսի և անհատների առանցքային դերը կլիմայական փոփոխության մարտահրավերներին և խնդիրներին դիմակայելու հարցում:

Հիմնաբառեր. կլիմայի փոփոխություն, համաշխարհային տնտեսություն, ածխածնի երկօքսիդի գլոբալ արտանետումներ, ածխածնի հարկ, սահմանափակման և առևտրի համակարգեր, վերականգնվող էներգիայի աղբյուրներ, ցածր ածխածնային տնտեսություն

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ВАГЕ МИКАЕЛЯН

Доцент кафедры «Финансы» АГЭУ,
кандидат экономических наук

ТАТЕВИК ВАРДАНИЯН

Преподаватель кафедры «Международные экономические отношения» АГЭУ,
кандидат экономических наук

Воздействие изменения климата на мировую экономику.– Изменение климата, глобальное явление, вызывающее первостепенную озабоченность, имеет глубокие последствия для мировой экономики. Эта научная статья представляет собой всестороннее исследование многогранного воздействия изменения климата на глобальный экономический ландшафт, опираясь на обширный объем исследований и анализа.

Исследование углубляется в непосредственные экономические последствия, возникающие в результате повышения температуры и экстремальных погодных явлений. В нем тщательно изучается влияние климатической политики, включая установление цен на выбросы углерода и субсидии на возобновляемые источники энергии, а также оцениваются связанные с ними затраты и выгоды. Кроме того, в статье исследуются экономические возможности, которые появляются по мере перехода мира к низкоуглеродной экономике, уделяя особое внимание росту «зеленых» отраслей промышленности и стимулированию инноваций.

Таким образом, эта статья призвана обеспечить тонкое понимание сложной взаимосвязи между изменением климата и мировой экономикой. Это подчеркивает острую необходимость скоординированных глобальных действий по смягчению негативных последствий изменения климата, одновременно подчеркивая экономические возможности, присущие переходу к более устойчивой глобальной экономике. Основная цель данного исследования – способствовать всестороннему пониманию этих перспектив. В качестве ключевого вывода исследование подчеркивает исключительную важность для политиков, бизнеса и частных лиц решать как проблемы, так и возможности, открывающиеся в результате меняющегося климатического ландшафта.

Ключевые слова: *изменение климата, мировая экономика, глобальные выбросы углекислого газа, налог на выбросы углерода, системы ограничения выбросов и торговли квотами, возобновляемые источники энергии, низкоуглеродная экономика.*

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