Individual Project Report

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# Abstract

# Introduction

In our modern age, climate change has emerged as an important phenomenon which has captivated the attention of the scientific community. Principally, the interest is with whether activity of mankind has contributed to significant and meaningful change to the climate system. With respect to this, the industrial revolution, and its associated timeline, is seen as a notable point of interest due to the widespread shift towards large scale operations, the adoption of machinery and the utilisation of fossil fuels across economies. Therefore, it serves as a useful demarcation point to observe the impacts of humans, especially due to the accelerated uptake of fossil fuels. The large expansion in the scale of production combined with the technological reliance on fossil fuels have together led to a marked increase in overall fossil fuel usage, thus justifying the emphasis on the industrial revolution as a turning point.

Since then, these increases in fossil fuel usages have positioned fossil fuels as the integral energy backbone of the global economy. Fossil fuels contribute to climate change and produce their negative impacts primarily from the gaseous emissions that are released when they are burned and consumed. It is particularly the greenhouse gases from these gaseous emissions that, in turn, lead to negative impacts on the climate. These greenhouse gases contribute to the greenhouse effect, which is where radiation and heat from the Sun is reflected off the Earth’s surface and then absorbed by greenhouse gases in the atmosphere. Therefore, this heat is prevented from escaping back into space and rather is absorbed into the Earth’s climate, causing a heating effect. This heating effect is actually normal and has been critical to the stable and hospitable temperatures humans have experienced in recent times. However, this is only the case for the natural levels of greenhouse gases that are found in our atmosphere.

Thus, it is the scale of fossil fuel usage along with its associated mechanisms to negatively impact the climate that positions it as a key point of concern with regard to climate change.

Carbon dioxide is one of the key constituents involved and .

Change change in terms of the warming of global temperatures has become an important issue due to the .

Following robust and pertinent analysis, the scientific community has solidly reached the consensus that this is indeed the case. Paris, etc, submits COP26. In finance, this has lead to an impact in companies and therefore their sourcing of capital. This breaks down into transition risk and physical risk. Transition risk is primarily concerned with the implications and financial impacts as the broader economy shifts to a low carbon future. This primarily consists of policy & legal, technological, market and reputational risk. On the other hand, physical risk pertains to the financial implications when the effects of climate change have actually manifested. For example, with the operational disruptions that result from the extreme weather events that arise out of climate change. In our research, we strive to explore S&P and Trucost data to determine the statistical significance and economic magnitudes of the relationship between climate risks and equity returns. This will be conducted at the global scale. Then, the derivation of any carbon risk premium is congruent with the risk-averse nature of investors that is assumed in finance – they demand compensation regarding the uncertainty that they must endure on the cash flows of invested firms (arising from both physical and transition risk). Investors attitudes can also be seen as determining the discount rates of these cash flows and therefore the attention & pricing devoted to the transition risk.

Equilibrium models, following from the approaches of relevant prior work, will be implemented in order to investigate the stated relationship due to their ease of interpretability and congruency with the well-understood forces of supply and demand in economics.

Carbon intensity has a key issue in the fact that in that it still allows for total carbon levels to increase, which is not in line with neutralizing carbon emissions so that the progression of climate change does not continue. Otherwise, we could end up with a world with significant improvements in carbon intensity yet actual and important climate change targets (e.g. < 2C increase) that are exceeded.

Carbon emissions level is observed as quite a persistent state variable that is associated with a firm. However, it is more likely that what investors pay attention to is an associated underlying transitory state variable that reflects the slope and effort of decarbonization in the forward path to net-zero. This was hypothesized in the 2022 global pricing study.

# Literature Review

# Methodology

# Use of Data

# Analysis

# Conclusions