Impact of climate change on the risk-return characteristics of commodities and commodity futures

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Public Summary Report

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1 Executive Summary:

This paper looks into the factors like climate change, increasing temperatures and natural calamities and its effects on human, animal and plant life which play a part in determining the future prices and return volatility of commodities affecting the spot and roll yield of each commodity returns in the last 10 years. It also looks into successful and failed transition of the Paris Agreement and its effects to each commodity sector returns.

2 Client Background:

The company is a leading global provider of technology and solutions for risk and return management, enabling clients to manage their investment decisions. They delivers climate-informed scenario sets to their clients. These scenario sets describe future pathways that describe plausible trajectories with respect to the transition to a low carbon economy and increasing physical risk impacts, especially when this transition fails.

3 Issues addressed in the project:

Climate change and its effects on human, animal and plant life is arguably one of the most pressing challenges currently facing humanity. The unprecedented growth of the global economy over the past century has involved an increasing use of primary commodities and the associated emissions of GHGs. The higher GHG emissions, in turn, have accelerated climate change, which has had a negative impact on commodity production. The numerous challenges posed by global warming prompted the international community to act. On 12 December 2015 in Paris, the twenty-first session of the Conference of the Parties (COP) of the United Nations Framework Convention on Climate Change (UNFCCC) reached a landmark agreement to halt climate change and to boost efforts towards a low-carbon economy and a more sustainable future. The Paris Agreement, as it is called, is the first legal instrument adopted under the auspices of the UNFCCC that establishes binding commitments for countries, including developing countries, to prepare, communicate and implement plans to reduce GHG emissions and increase their ability to adapt to the adverse impacts of climate change. The different commodity sectors analyzed are:

1. Energy sector
2. Agriculture sector
3. Livestock sector
4. Industrial metals sector
5. Precious metals sector

4 Project Timeline:

January: Gather the last 10-year data of the different commodity sector returns.

February: Disentangle climate impact per component (spot, collateral, and roll) and in total per type off each commodity. Focus on spot and roll, as collateral return will be similar for all types.

March: Find the factors affecting the spot and roll yield of each commodity sector and develop accompanying narrative for each sector.

April: Work on the report

May-June: Deliver the report

5 Conclusion and lessons learnt:

I was able to look into different commodity sector returns in the last 10 years and their correlations with the climate change. I was able to determine how the returns were affected through these

factors. I was also able to determine how the successful and failed transition of the Paris Agreement would affect the future commodity sector returns and summarize them below:

- Energy commodity sector: Changes in temperature, precipitation, sea level, and the frequency and severity of extreme events will affect how much energy is produced, delivered, and consumed all around the world. in a warmer climate, people tend to use more electricity for air conditioning and less natural gas, oil, and wood for heating thereby increasing the returns for the energy sector, returns go down when winters get warmer reducing the need for heating. Returns also go up with more or more severe hurricanes. Smoother transition towards The Paris Agreement will reduce the demand for fossil fuels and increase the demand for renewable energy sources. A failed transition may cause an increase demand for the traditional sources like coal, natural gas etc. and increase the returns for the energy commodity sector.

- Agriculture commodity sector: Agriculture in the United States produces approximately $200 billion a year in commodities. Crops grown in the United States are critical for the food supply here and around the world. Increasing number of and severity of natural disasters like droughts, floods, hurricanes lead to increasing agricultural commodity returns. The transition to sustainable growth in agricultural production during the 21st century will take place within the context of a transition to a stable population and a possible transition to a stable level of material consumption.

- Livestock commodity sector: Livestock production is a rapidly growing sector. It accounts for 40 percent of the global agricultural gross domestic product and is crucial for food security in all regions. Increasing temperatures and climate changes lead to increasing livestock commodity returns. A smoother transition could create opportunities for livestock farmers to boost production of alternatives and increase the livestock commodity returns in the future. A failed transition may increase climate and weather-related events which reduce the returns of the livestock commodity.

- Industrial metals commodity sector: Modern civilization process brings on the one hand, better living standards, on the other hand, it has negative side effects in the form of impaired ecological, biological, and natural conditions of life. The United States is the world's leading producer of coal, beryllium, soda ash, sulphur and the third largest producer of gold and copper and account for 2% of world's GHG emissions. In the long run, it is quite feasible that the supply chains for currently intense products will separate into pieces, with the most GHG intensive parts (e.g. clinker and iron ore reduction) being done in regions with ample CCS geology or clean electricity.

- Precious metals commodity sector: Precious metals are precious because they are rare. The three major precious metals that trade on futures exchanges around the world are gold, silver, and platinum. Gold futures returns show good performance in times of recession and bad performance with strong economic growth. A booming economy due to a successful and orderly Paris transition will therefore hurt gold future returns and a failed transition will benefit gold future returns and increase the returns for commodity index.