



Climate Change Vulnerability and Currency Returns

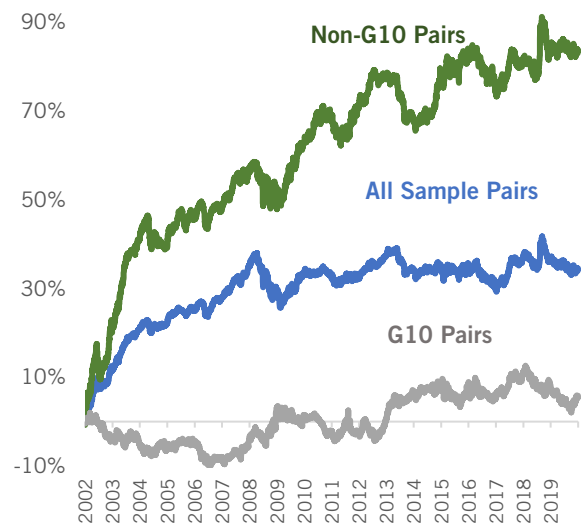
Past trends in climate vulnerability predict currency returns. Investors can build physical risk resilient portfolios to manage physical risk from climate change with liquid FX instruments.

Climate change has already had substantial physical impacts across countries. Even if we were able to stop emitting carbon today, these physical impacts are expected to accelerate in the next years and decades. Notably, physical risk from climate change is highly localized, meaning that some countries and economies have higher vulnerability to climate change than others due to geographic locations, variations in climate sensitivity, and differences in adaptive capacity. In this study, we investigate the relationship between physical risk and currency returns, and demonstrate how investors can build climate resilient portfolios in the FX market.

First and foremost, we find past trends in climate vulnerability predict currency returns, using vulnerability data from ND-GAIN. While the level of climate vulnerability can be largely explained by economic fundamentals, we find only a small proportion in the vulnerability momentum can be analogously explained, suggesting that most information in vulnerability momentum is not yet reflected in the country-level characteristics. We then demonstrate how investors can construct portfolios with decreasing physical risk based on past 5-year momentum in vulnerability with 29 of the most traded currencies across developed and emerging markets.

During our sample period 2002-2019, this physical risk resilient portfolio generates a positive and significant alpha, after controlling for a set of fundamental macroeconomic factors and common FX risk factors. Particularly, we find this phenomenon is more pronounced among non-G10 pairs, predominately driven by EM currencies. Moreover, double-sorting on both level and momentum in vulnerability reveals that the level of vulnerability provides important context to vulnerability momentum – improving from a risky base is rewarded more than improving from a less risky base.

FX Physical Risk Resilient Portfolios
Cumulative Risk-Adjusted Performance



Note: This figure presents the risk-adjusted performance for the long-short portfolios based on past 5-year vulnerability momentum from 2002 to 2019 for all pairs in our sample, G10 pairs and non-G10 pairs in our sample. In all portfolios, currencies with decreasing risk are funded by currencies with increasing risk and currency pairs are equally weighted. The risk-adjusted returns are calculated from multi-factor regressions of portfolio returns on FX risk factors including G10 market, G10 carry, G10 value, G10 momentum, EM market, EM carry, EM momentum, and global carry. The green line labelled “Non-G10 Pairs” represents the portfolio performance based on a sample of 19 non-G10 currencies including BRL, CLP, COP, CZK, HUF, IDR, ILS, INR, KRW, MXN, MYR, PEN, PHP, PLN, RUB, SGD, THB, TRY, and ZAR. The blue line labelled “G10 Pairs” represents the portfolio performance based on a sample of G10 currency pairs. The grey line labelled “All Sample Pairs” represents the portfolio performance for all 29 currencies including the G10 and non-G10 currencies. We form these portfolios annually on the last business day of the year and the returns are calculated using spot and 1-year forward contracts. Source data: ND-GAIN, DataStream.

In addition, we find emerging economies have higher climate vulnerability than developed economies due to lower adaptive capacity instead of exposure or sensitivity; however, this vulnerability gap between EM and DM has been shrinking over time. By linking to natural disaster loss data, we confirm that more vulnerable countries experience greater economic losses and more human lives affected by natural disasters.

We hope our study provides early evidence in a portfolio setting of how investors could use liquid FX instruments and information in climate vulnerability to manage physical risk and preserve asset values in domestic and foreign currencies


For more on this topic, see our 2022 Financial Analysts Journal article: "[Climate Change Vulnerability and Currency Returns](#)" by Alexander Cheema-Fox, George Serafeim, and Hui (Stacie) Wang on Insights, our research platform.

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