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RISK SOLUTIONS | WHITE PAPER

Geopolitical Risk—Analyzing the Age of Uncertainty

by Matthew Lightwood, Ph.D.

Executive Summary

- Geopolitical risk has regained prominence since the Russian invasion of Ukraine, prompting a need for a better understanding of its impact on financial markets.
- Despite challenges in measuring and quantifying geopolitical risk, initiatives like the Bank of England's systemic risk survey and the GPR Index are a good basis for more robust analysis.
- Regression analysis reveals mixed findings on the relationship between geopolitical risk and financial market variables; however, it still suggests that forecasters and analysts may be wise to consider geopolitical risks in their work.
- Surprisingly, heightened geopolitical risk has not necessarily led to reduced asset returns in the last 40 years, challenging conventional assumptions.

Introduction

The Russian invasion of Ukraine and the global fallout in its aftermath have once again thrust geopolitical risk to the forefront of risk managers' minds. However, even with the awareness that geopolitical risk has increased in recent years, few are familiar with the data and tools that are available to investigate that risk's effects on financial markets from a solid quantitative basis. In this whitepaper, we look at the importance of geopolitical risk, present recent developments in its measurement, and investigate the extent that geopolitical shocks affect financial markets.

What Is Geopolitical Risk and Why Does It Matter?

Geopolitical risk refers to the potential impact of global political and strategic factors and events on the stability and security of nations, regions, and the world at large. These risks arise from the interactions and conflicts between different countries, governments, and political entities, often influencing international relations and shaping the geopolitical landscape. Geopolitical risk encompasses a broad range of elements, including territorial disputes, military tensions, trade disputes, political instability, and ideological conflicts, including terrorist attacks. It is a highly dynamic and multifaceted concept that we would expect to have significant implications for economic activity and financial markets.

As risk managers, investors, and analysts, we care about geopolitical risk because of its ability to create uncertainty and unpredictability. Changes in government policies, diplomatic relations, or the outbreak of conflicts can disrupt supply chains, impact investment decisions, and lead to fluctuations in commodity prices. Additionally, geopolitical risk can contribute to the escalation of regional or global tensions, potentially leading to military confrontations or the imposition of sanctions. Geopolitical risk analysis assesses the potential impact of political events on the global economy, and understanding and managing this risk is crucial for businesses, investors, and policymakers wishing to mitigate its potentially negative consequences. However, it can be a difficult effect to measure and hence analyze in an unbiased way, but developments have been made in this area which we will discuss in the next section.

How Can Geopolitical Risk Be Measured?

While we might intuitively believe that an increase in geopolitical risk negatively impacts asset returns, only analysis of the data can confirm or contradict that expectation. However, unlike a stock price or interest rate, the current level of geopolitical risk cannot be determined absolutely. We may feel that the current levels of geopolitical risk are high, but we will have difficulty quantifying that level or categorically stating that there is more or less risk today than at other times in history (e.g., post-9/11).

Despite the difficulties, several attempts have been made to create indexations of geopolitical risk. For instance, the Bank of England conducts a quarterly systemic risk survey and publishes the results as a set of indices for different risk sources. The index is constructed by asking participants for their view on a range of risks, including geopolitical risks. Participants are chosen from a range of financial institutions, including UK and foreign banks, asset managers, hedge funds, insurers, pension funds, large non-financial companies, and central counterparties. The complete history of the geopolitical risk index is shown in **Figure 1**. The y axis represents the total percentage of respondents who included geopolitical risk at least once when asked to describe the top five risk factors that would be most difficult to manage should they arise today.

While this data is useful in monitoring perceived levels of geopolitical risk, it suffers from several deficiencies which make it impractical to use for meaningful quantitative analysis. First, the history is short and likely does not incorporate a large enough sample of geopolitical shocks to investigate the effects on financial markets in a meaningful way. Secondly, the quarterly frequency is not high enough to statistically analyze the relationship with more volatile

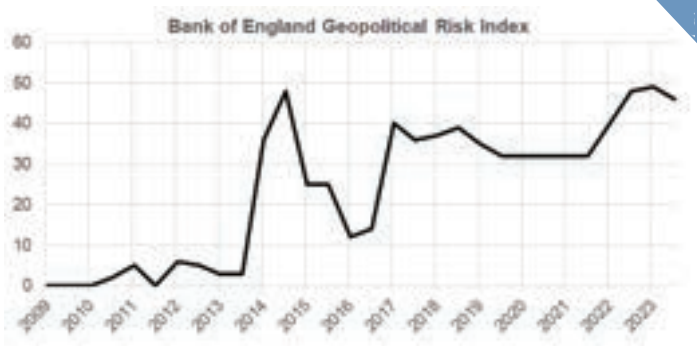

Figure 1: Geopolitical risk component of the Bank of England systemic risk survey. Source: ©2024 Bloomberg L.P.

time-series data such as the return on stocks and bonds or oil prices.

An alternative and perhaps more useful resource is the GPR Index,[1] which constructs a measure of adverse geopolitical events and associated risks based on an analysis and automated daily monitoring of newspaper articles from 1900 to the present day. From 1985 onward, the index is constructed using an analysis of ten newspapers, with the longer historical index being constructed from three newspapers. For the analyses which follow, we use only the post-1985 data. The daily values of the 28-day mean value of the index are shown in **Figure 2**, with some of the most significant geopolitical events within the sample marked.

In the sections that follow, we use this index to explore the relationship between measured geopolitical risk and financial market returns.

1 Caldara, Dario and Matteo Iacoviello (2022), "Measuring Geopolitical Risk," American Economic Review, April, 112(4), pp.1194-1225.

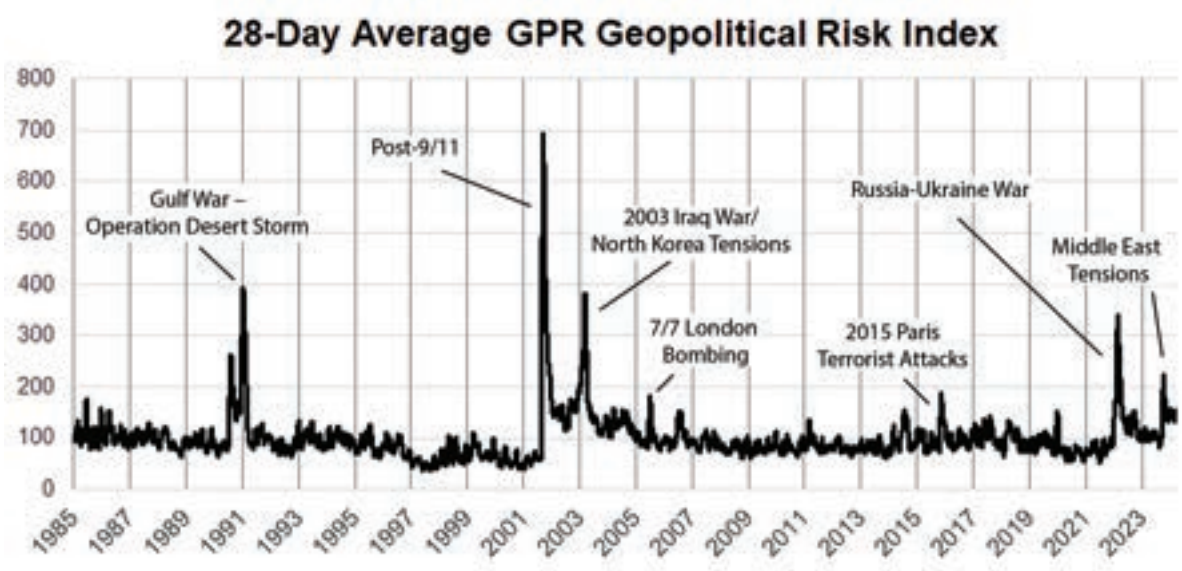

Figure 2: The 28-day average of the GPR Geopolitical Risk Index between 1984 and 2024. Prepared by Conning, Inc. Source: Dario Caldara and Matteo Iacoviell, https://www.matteoiacoviello.com/gpr.htm, downloaded April 17, 2024.

Is Geopolitical Risk a Driver of Financial Markets?

We will begin by performing an ordinary least-square regression analysis on three financial market variables, EAFE Equity Index,[2] Brent Crude Oil, and the 10-year United States Treasury Yield. Tests are performed on the returns and volatility of these variables to determine if returns—or the absolute level of the lagged GPR index over the previous 21 trading days—have any significant explanatory power for forecasting market effects. The analysis is intended to determine what, if any, statistical relationship exists between the measured geopolitical risk and financial market variables. The GPR index has been scaled by a factor of 0.001 for the regression analysis such that it is of the same order as the returns or yields.

Table 1 shows the measured coefficients, β, and statistics of the three most significant lags of the GPR index (column 2) in forecasting the modeled variable (column 1). The analysis is based on a sample of daily frequency data between January 1, 1986 and April 15, 2024.

Of more interest are the *t*-statistic and *P* values of the explanatory variables. A general rule of thumb is that a *t*-statistic with an absolute value of 2 or higher is considered to be statistically significant with respect to the measured coefficient, β. Considering the results in table 1 we may draw the following conclusions:

1. Over longer time horizons, neither GPR returns nor levels are significant factors in describing returns or volatility of the equity index tested. However, the *t*-statistics using GPR returns as an explanatory variable are close to 2.

2. Both GPR returns and levels may be significant explanatory variables in determining returns on Brent Crude Oil.

3. Of all the variables tested, GPR levels against Brent Crude Oil Returns were the most significant. Lags of -13, -11, and -14 days all had significant βs at greater than the 95% confidence level.

2 The EAFE index was chosen as representative of global effects in equity prices without the presence of powerhouses like the U.S. and China.

Modeled Variable	Explanatory Variable	β	Lag (days)	t Statistic	P>|t|
EAFE Equity Returns	GPR returns	0.5000	-18	1.973	0.049
		0.5000	-12	1.881	0.060
		-0.4000	-21	-1.715	0.086
EAFE Equity Returns	GPR level	-0.0048	-17	-1.400	0.161
		0.0047	-2	1.386	0.166
		0.0045	-15	1.326	0.185
EAFE Equity 21-Day Volatility	GPR level	-0.0017	-21	-1.164	0.245
		0.0011	-9	0.702	0.483
		0.0010	-8	0.641	0.522
Brent Crude Returns	GPR returns	1.7000	-13	2.468	0.014
		-1.0000	-1	-1.505	0.132
		-0.9000	-11	-1.406	0.160
Brent Crude Returns	GPR level	0.0229	-13	2.642	0.008
		-0.0211	-11	-2.438	0.015
		-0.0211	-14	-2.136	0.033
Brent Crude 21-Day Volatility	GPR level	0.0040	-4	0.948	0.343
		0.0040	-6	0.929	0.353
		0.0037	-2	0.872	0.383
US 10y Yield Returns	GPR returns	-1.2000	-8	-2.156	0.031
		-0.9000	-14	-1.720	0.085
		0.8000	-19	1.473	0.141
US 10y Yield Returns	GPR level	0.0145	-9	2.043	0.041
		-0.0142	-20	-2.04	0.041
		-0.0106	-7	-1.491	0.136
US 10y Yield 21-Day Volatility	GPR level	-0.0013	-21	-0.313	0.754
		-0.0009	-20	-0.210	0.834
		-0.0008	-1	-0.182	0.856

Table 1: Results of ordinary least square regression analysis. Shown are the statistics of the three most significant lags of the Explanatory Variable in forecasting the modeled variable. Prepared by Conning, Inc. Sources: ©2024 MSCI Inc. (MSCI) and ©2024 Bloomberg L.P.

4. GPR levels are not significant in describing the volatility of Brent Crude Oil Returns.

5. Both GPR returns and levels may be significant explanatory variables in determining relative changes in long-term treasury yields but not in determining the volatility of yields.

These analyses consider the relationship across the entire history of data, encompassing as they do periods of low, average, and high geopolitical risk. In the next section, we consider a perhaps more important question—that of the effect of heightened geopolitical risk on asset returns.

Does Geopolitical Risk Reduce Asset Returns?

It is assumed that heightened geopolitical risk causes shocks to financial markets which reduce returns on assets in the short to medium term. Using the GPR index, we can investigate the extent to which this hypothesis has been true since 1985. Specifically, we investigate the extent to which returns on the EAFE Equity Index are influenced by levels of the GPR index. We do this by considering the cumulative price return on equities over three different holding periods—5 days, 21 days, and 1 quarter—directly after a shock to the GPR index in excess of some defined threshold, τ. In **Figure 3** we consider the proportion of cumulative returns over the holding period that are negative for increasing values of τ and compare this to the proportion across the entire sample. This enables us to visualize whether increased geopolitical risk is generally associated with higher levels of negative returns in the short and medium term.

Contrary to what we might expect, we observe that across all three holding periods the proportion of negative-return periods is lower when the GPR geopolitical risk index is above its mean level (108) than the mean of the whole sample (dashed lines, all of which are close to 45%).[3] Further, we can see that the medium-term 21-day and quarterly holding period returns exhibit significantly lower levels of negative returns for larger geopolitical shocks relative to smaller shocks. For instance, following a shock to the GPR index level in excess of 260, the price returns over the next 21 days are negative in 32.9% of cases. For larger shocks in excess of GPR levels of 340 and 400, the proportion of negative 21-day returns falls to 15.9% and 8.5% respectively, with the same trend observed for the quarterly holding period.

It is interesting and unexpected to note that the proportion of negative holding-period returns may be lower in the case of higher

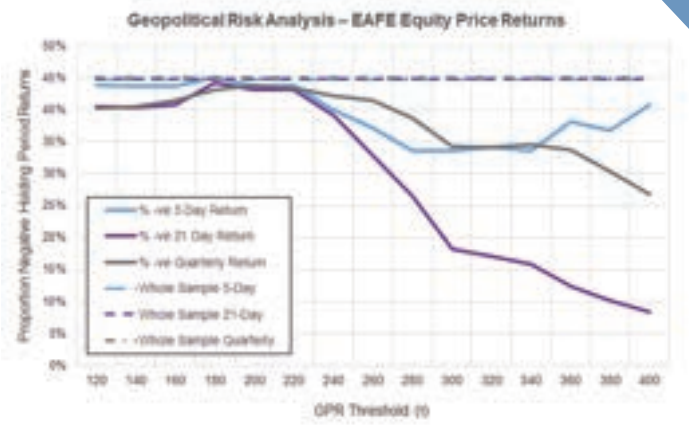

Figure 3: Proportion of returns which are negative in the holding period (5-day, 21 days, 1 quarter) following a shock to the GPR Index level in excess of the threshold, τ, between January 1986 and April 2024. Also shown are the equivalent whole sample values (dashed line). Prepared by Conning, Inc. Sources: ©2024 MSCI Inc. (MSCI) and ©2024 Bloomberg L.P.

geopolitical risks. However, we should also consider whether the returns themselves over these holding periods are suppressed in the aftermath of a geopolitical event. **Figure 4** shows a similar threshold analysis to the one above, with the key difference that we have measured the mean holding period return for all events in excess of the threshold τ.

Despite our expectations, we observe mean returns which are higher, not lower, than the whole sample means (dashed lines) for all three holding periods. What's more, higher geopolitical risk appears to be associated with increasing returns of the EAFE Equity Index over the 21-day and quarterly holding periods. For instance, quarterly returns are on average over 4% for quarters following a shock to the GPR index level in excess of 300. This compares with the whole sample mean of just 1.51%.

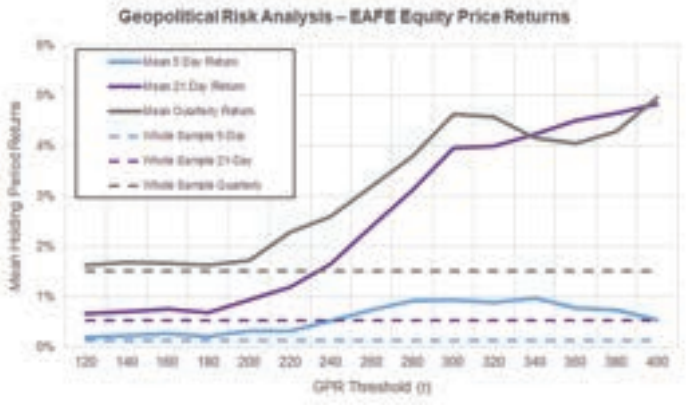

Figure 4: Mean returns in the holding period (5-day, 21-day, 1 quarter) following a shock to the GPR Index level in excess of the threshold, τ, between January 1986 and April 2024. Also shown are the equivalent whole-sample values (dashed line). Prepared by Conning, Inc. Sources: ©2024 MSCI Inc. (MSCI) and ©2024 Bloomberg L.P.

3 We acknowledge that in the study, Caldara, Dario and Matteo Iacoviello (2022), "Measuring Geopolitical Risk," American Economic Review, April, 112(4), pp.1194-1225, geopolitical shocks using quarterly data were found to suppress S&P 500 (United States) equity returns. The analysis presented here differs in the frequency of the data used, research method and the region considered. We performed an identical impulse response analysis to the one in the paper using daily and weekly data, and our conclusions for the EAFE Equity Index do not change.

Summary

Geopolitical risk has surged to the forefront of risk managers' concerns following the Russian invasion of Ukraine and its global repercussions. Despite increased awareness, the data and tools for quantitatively investigating the impact of geopolitical risk on financial markets remains underutilized. By examining the relationship between measured geopolitical risk and financial market variables, we can gain valuable insights which might help us better understand the nature of these risks.

While existing indices like the Bank of England's systemic risk survey offer valuable insights, they may lack the historical depth and frequency required for meaningful quantitative analysis. Alternatively, the GPR Index provides a robust measure of adverse geopolitical events, allowing for a more nuanced exploration of the relationship between geopolitical risk and financial market returns. Through regression analysis, we showed that there is an argument to be made that forecasters and analysts should consider geopolitical risk data in their work. The use of threshold analysis revealed that even heightened geopolitical tensions were not necessarily associated with negative impacts on global equity prices in the past 40 years. This finding somewhat challenges our conventional assumptions about the impact of geopolitical risk on asset returns but perhaps gives comfort that market, government, and central bank interventions have so far been effective at cushioning financial markets from the worst of the effects.

About the Author

Matthew Lightwood, Ph.D, BSC (HONS), is a Managing Director at Conning where he is responsible for product management, quantitative modeling and providing technical expertise in economic modeling to support both prospective and new clients using the GEMS® Economic Scenario Generator. Prior to joining Conning in 2010, he was employed as a Senior Risk Consultant, where he was responsible for financial modeling as well as managing and implementing large professional services projects for financial clients. Matthew is a graduate of the University of Manchester and University College London, where he earned a BSC (HONS) in Physics with Astrophysics and a Ph.D in High Energy Particle Physics.

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