The University of Chicago

Does FDI Matter?

Assessing How Foreign Direct Investment Impacts the Geography of Defense Spending

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Abstract

What is the relationship between the level of economic interdependence among states and the geography of defense spending? I argue that as the level of economic interdependence in a region increases, the geographic structure of defense spending weakens. States in a highly interdependent system will have defense expenditures that correlate weakly to the defense expenditures of nearby states. Conversely, in a less interdependent system, states with high defense expenditure are more likely to be located near other states with high defense expenditure. The argument is evaluated by constructing spatial models of defense spending in Europe in the period of 1995-2019. The models will produce the Moran's I statistic, which measures the geographic structure of defense spending, and a count of *threat responsive* countries, defined as states with high defense expenditure in proximity to other states with high defense expenditure. Foreign direct investment flows is used to operationalize the economic interdependence variable. The resulting linear regressions shows a significant inverse relationship between the level of foreign direct investment and the number of threat responsive countries.

Introduction

Especially in the United States, globalization has become a punching bag of sorts for the self-described average American. Dismissed as a scheme to benefit the ultrarich, vilification of globalization has become a pillar of populist rhetoric in the United States and abroad. Brexit, for example, was in part fueled by isolationist logic. As the global wave of populism continues, more leaders on the world stage may themselves question the efficacy of institutions that promote an interconnected world. Proponents of globalization like to argue in economic terms: interconnectivity can bring about short-term inconveniences, but in the long-term, the consumer and overall economy benefit greatly. Perhaps arguments in support of globalization need a fresh look. What if globalization can be tied to a more tangible concept, like security?

This paper will therefore explore the relationship between the economic aspect of globalization and international security. This paper will address the following question: what is the relationship between the level of economic interdependence among states and the geography of defense spending? In other words, when the level of economic interdependence is high, do states tend to spend more on defense when nearby states also spend relatively high on defense, or this is a behavior that tends to occur more often when the level of economic interdependence is low? A classical realist perspective would suggest that, given the logic of the security dilemma, states will inevitably respond to a neighbor's increasing military budget regardless of that neighbor's own reasons for doing so. However, a liberal perspective would predict otherwise. Strengthening international institutions and economic interdependence would dampen the effects of the security dilemma (Ikenberry 1999), thus making the geographic component of defense spending much less significant.

The current consensus of the literature is that, globally speaking, defense spending is significantly spatially lagged (Shin and Ward 1999; Yesilyurt and Elhorst 2017; George and Sandler 2018; Goldsmith 2007; Flores 2011). In other words, geography matters in the distribution of global defense spending. The average state in the global system spends an amount on defense that correlates with the amount nearby states spend on defense. Thus, states that spend higher than the global average on defense are likely to be located near other states that also have defense expenditures higher than the global average. The current literature does not, however, address what factors may or may not contribute to this condition.

I will answer this question by arguing that as the level of economic interdependence in a region increases, the geographic structure of defense spending weakens. States in a highly interdependent system will have defense expenditures that correlate weakly to the defense expenditures of nearby states. Conversely, in a less interdependent system, states with high defense expenditure are more likely to be located near other states with high defense expenditure. A few channels may explain this relationship. First, commitment to international economic institutions establish powerful norms that frame arms-racing and aggressive, war-like postures as unproductive and undesirable. Second, states that make policies welcoming FDI, a process driven primarily by domestic politics and lobbying from multinational companies, send costly signals that they are averse to initiating conflict. Third, increasing economic interdependence increases the opportunity cost of forgone economic revenue as a result of going to war, or at the very least the loss in investment due to the perceived risk from a potentially hostile political situation.

I will evaluate this argument by constructing spatial models of defense spending in Europe in the period of 1995-2019. The models will produce a statistic called Moran's I (see the Data

Analysis section below for details), which will measure the geographic structure of defense spending. The resulting Moran's I plots will also be used to extract the yearly number of *threat responsive* countries, defined as states with high defense expenditure in proximity to other states with high defense expenditure. I will construct a linear regression model to estimate the impact of the level of economic interdependence in Europe on these statistics. Economic interdependence will be defined as the level of foreign direct investment (FDI) flows in the international system. FDI is defined as an investment made by an entity within one country into businesses in another country, usually via establishing foreign business operations or acquiring foreign business assets (Chen 2021). FDI flows will be used to measure economic integration because it reflects a state's political willingness to adopt policies that make it attractive to foreign private entities for investment. These investments are by nature inelastic, unlike tradable goods which can be stored or rerouted if the initial buyer is no longer able or willing to accept the goods. FDI therefore captures an important element of economic integration: states must think about their future priorities.

This paper has broader implications for literature on the security dilemma, the political effects of foreign direct investment, international economic institutions, and great power relations. If the evidence supports my argument, proponents of the logic behind the security dilemma may need to consider conditions which can strengthen or weaken the influence of the security dilemma on state behavior. By providing an empiric link between FDI and more peaceful interstate relations, scholars studying the effect of international institutions can use this paper's argument to support hypotheses about the effect of international institutions on state behavior. This paper also has implications for scholars studying great power relations. Does FDI have an impact on defense

spending behavior in a two-state system? Do powerful states with interests, assets, and military forces spread around the globe act similarly to weaker states when FDI is high or low? These are questions scholars of great power relations can consider as further research stemming from this paper.

The remainder of this paper is organized as follows. First, a literature review will summarize the current scholarly work on the relationship between defense spending and geography. The literature review will also discuss literature on arms-racing and economic interdependence. These bodies of literature will ground this paper's research question and argument in existing theories of defense spending patterns and the political effects of foreign direct investment. The paper will then detail my argument about how economic interdependence is related to the geographic structure of defense spending. Next a research method section will discuss this paper's approach to uncovering this relationship. Then a data and analysis section will discuss the evidence and whether it supports my theory. Finally the conclusion will summarize these results and provide remarks on real-world implications and suggestions for future research.

Literature Review

This paper is primarily situated within the bodies of literature on the geography of defense spending and economic interdependence. I will first briefly introduce the existing studies on the topic and explain how this paper will contribute to knowledge on the subject. Then I will introduce literature on arms racing. Although this paper does not seek to make claims about arms racing, understanding the structural variables that cause states to change their defense spending habits in response to other states will help identify a causal mechanism through which increasing economic interdependence may dampen arms racing behavior. Finally, I will introduce literature about economic interdependence. Interdependence literature will act as a connection between the empirics of this paper and existing macro-level theories of international relations.

GEOGRAPHY & DEFENSE SPENDING

The current consensus of the literature is that, globally speaking, defense spending is significantly spatially lagged. In other words, geography matters in the distribution of global defense spending. The average state in the global system spends an amount on defense that correlates with the amount nearby states spend on defense. Thus, states that spend higher than the global average on defense are likely to be located near other states that also have defense expenditures higher than the global average.

Goldsmith (2007) uses military budget to GDP ratios across 120 countries to support his theory that security dilemma dynamics create geographic structures in defense spending. Yesilyurt and Elhorst (2017) use a more robust set of control variables and modelling techniques to reproduce the same result. George and Sandler (2018) examine the institutional effects of alliances

on military spending alongside the geographic component, finding a freeriding effect among NATO members. Flores (2011) also analyzes the effects of alliances, concluding that military expenditures are positively correlated with allies' military expenditures. The two articles suggest that both geography and institutional membership are predictors of defense expenditure. Finally, Shin and Ward (1999) bring economic interdependence into the equation by arguing that geographically proximate countries interact more frequently than less proximate ones, using GDP growth and defense expenditure as signals of interaction.

Two major gaps exist in the current literature. First, the current literature has a global scope. Some analyses of regional variations in defense spending patterns do exist, but the literature generally does not advance beyond global models of defense spending. This is problematic because the identification and analysis of local clusters can reveal a wider range of spatial relationships. For example, a state with a high defense budget surrounded by those with low defense budgets could represent a significant cluster of negative spatial autocorrelation. Therefore, significant clusters that buck the overall trend of the model are worth analyzing.

Second, the literature ignores the changing nature of the overall system. Although the studies all find a significant geographic structure to defense spending, there is little analysis of whether this geographic structure has changed alongside the international system. The studies generally choose a fixed year to conduct their analyses, so the effect of changing variables at the international level is not present in the studies. Furthermore, literature on the topic is quite sparse. Most of the authors listed have an economics background, consequently they ignore the application of international relations theory. This paper will primarily advance the existing literature by teasing

out the relationship between changing factors in the international system on the geographic relationship of national defense spending.

ARMS RACING

Gray (1971) establishes a foundation for arms racing literature. According to Gray, arms races can be unilateral, bilateral, or multilateral. Arms races do not necessarily occur between mutual adversaries. They also may occur within formal alliances or even within the different armed service factions of a state. Arms races may therefore originate without any particular political antagonisms – an "autonomous arms increase" may be matched by a nearby state as a precautionary move, thus triggering a cycle of armament interactions and political hostility (Gray 1971, 41). Gray grounds his theory of arms racing within the logic of the security dilemma. Although states may increase their defense spending for domestic political reasons, external states cannot ignore this increase based on the assumption that the increase is purely inward-facing (Gray 1971, 39).

Gray's theory is mostly echoed by other scholars of arms racing. Glaser (2000) attempts to adjudicate between two schools of thought. The first argues that arms races are rational responses to external threats while the second school of thought argues that arms races are suboptimal decisions made by states as a result of internal process such as domestic politics or pressure from the scientific establishment (Glaser 2000, 251). Glaser finds that arms races with origins in internal politics tend to lead to negative external consequences (i.e. war), while arms races with external origins tend to reach a point at which mutual deterrence is achieved, thus eliminating the potential for negative fallout (251).

Rider (2009) also attempts to understand the reasons behind the onset of arms races. Rider assumes that political leaders are aware that arms racing can result in a negative net benefit by producing a war the race was meant to prevent. Therefore, states do not necessarily arms race based on perceived threat, instead they arms race when salient stakes are at risk. In particular, when territory is at stake, states participate in arms-racing behavior (Rider 2009, 693). Kydd (2000) uses game theory as evidence to suggest that arms racing is rational behavior meant to deter actors with conflicting political interests from disturbing the status quo. The two authors therefore converge on the idea that arms racing is not an automatic spiraling phenomenon triggered by irrational actors. Instead, arms buildup is a rational move governed by careful cost-benefit analysis to reach a strategic goal.

The aim of this paper is not to adjudicate between varying theories of arms racing. Instead, the presentation of this literature yields some key mechanisms behind arms buildup that impact how states in proximity to one another may behave differently than states not in proximity to one another. First, Rider's (2009) argument that territory is a powerful threat that can trigger arms racing suggests that arms racing behavior between distant states is less likely to occur than arms racing behavior between nearby states. This may help explain why the literature on the geography of defense spending finds a significant spatial correlation within the level of state defense expenditure. Second, the idea that arms racing can be a deliberate, strategic move to preserve the status quo suggests that if alternative means or incentives to preserve the status quo exist, then states will not benefit from arms racing behavior.

Jervis (1978) argues that in the absence of a global sovereign, states exist under the logic of the security dilemma, meaning that states act under the assumption that other states in the international system pose a looming threat. He then asks what variables ameliorate the condition of anarchy and the logic of the security dilemma. Simply put, something must increase the gains of mutual cooperation and decrease the cost if one state cooperates and the other does not. For Jervis, economic interdependence is not enough to ameliorate the security dilemma logic. Instead, engaging in exploitative behavior presents opportunity costs for future trade partners and incurs direct prestige costs of engaging in behavior frowned upon by the international community (Jervis 1978, 179).

In two papers, Oneal and Russett (1999) find empirical evidence to support Jervis's theory of state cooperation under the security dilemma. Their research finds that because trade is mutually beneficial, trading with a partner not only increases the opportunity cost of going to war with them, but it also creates an investment in the overall wellbeing of the trade partner (Oneal and Russett 1999, 270). Put differently: "Trade pays more than war, so dependent states should prefer to trade not invade." (Copeland 1996, 8)

Dependence is an important factor to consider in the relationship between trade and war. In a two-state system, State A may have a comparative advantage in producing good X, while State B may have a comparative advantage in making good Y. If both countries freely traded, they would mutually maximize profits if State A ceased production of good Y and only produced good X and if State B ceased production of good X and only produced good Y. These states can therefore be considered dependent on each other, particularly if goods X and Y are necessary for each other's production. In such a system, a war would be catastrophic and leave both countries worse off than

the scenario in which they never traded in the first place (Copeland 1996, 18). Economic interdependence therefore greatly inflates the opportunity cost of war.

A growing body of literature seeks to find a more precise relationship between foreign direct investment (FDI) and interstate conflict. During the 1980s and 1990s, the level of FDI in the international system experienced rapid growth, in large part due to domestic-level efforts to reduce import duties and corporate taxes (Polachek, Seiglie, and Xiang 2005, 1). In particular, the level of FDI flows in the global system increased tenfold between 1980 and 2002, which makes the time period of this paper's analysis particularly interesting (Bussmann 2010, 46). The prevailing argument in this set of literature is similar to mine. In a two-country system, increasing FDI flows results in economic benefits for both the home and host country. Initiating a conflict within this two-country system would result in a loss of economic gains via FDI. In order to attract investors, states are incentivized to refrain from risky, militarized policies.

Unlike trade, FDI is long-term in nature. Trade is elastic in the sense that goods can be traded to another party if a conflict erupts with the intended partner. Goods can also be stored until the conflict is resolved. However, investments on behalf of multinational companies cannot be withdrawn or transferred to a secondary party. FDI may therefore have a more potent effect on governments' resolve to maintain peaceful relations with other states (Polachek, Seiglie, and Xiang 2005, 7). Polachek, et al (2005) model the relationship between FDI and cooperation using sets of two-country dyads in the world system. The authors find that, on average, an increase in FDI flows predicts an increase in their dyadic cooperation variable.

Bussman (2010) extends the theoretical link between FDI and conflict by introducing literature on costly signals. If the condition of information asymmetry, when two states have very

different levels of information about each other's intentions, is a strong predictor of conflict onset, then reducing information asymmetry can bring about peace. Talk is cheap, but investing in another country is not. Bussman therefore argues that investing in other countries and engaging in policies that welcome FDI inflows sends costly signals to other nations. These signals reveal information about the country – namely that war is not a priority. Bussman finds that as a country's FDI flows increase, its likelihood of engagement in international militarized disputes decreases. Economic interdependence can therefore reduce conflict by eliminating the information gap between states and by sending costly signals about a state's future intentions.

Lee and Mitchell (2012) introduce a geographic element into the literature by asking whether increasing FDI can prevent border disputes from occurring altogether, or whether increasing FDI simply raises the cost of starting border disputes. They argue that multinational companies are less willing to invest in states that exhibit realpolitik (i.e. arms racing) behavior, have ongoing border disputes, or have a history of border disputes, because their business investments are less likely to pay off in the long run. From a state's perspective, it may be more profitable to forgo a territorial claim and negotiate a peaceful resolution to a border dispute than pay the opportunity cost of lost multinational investment. Their empirical analysis shows that at the global level, increasing FDI flows predict a decrease in the number of challenger states making issues claims about borders with neighboring states (Lee and Mitchell 2012, 690).

Argument

I argue that as economic interdependence increases, states are less likely to increase their defense spending in response to an increase in a nearby state's defense spending. Put differently, proximity between states does not predict a positive correlation in defense spending when involvement in economic integration is high. The primary independent variable is the level of economic interdependence. This will be measured by the level of foreign direct investment (FDI) flows.

My dependent variable will be the geographic structure of defense expenditure. This will be measured by the Moran's I spatial autocorrelation statistic of defense spending. As a secondary dependent variable, I will also analyze the numbers of observations, which I will label *threat responsive* countries, existing in clusters of high levels of defense expenditure. This method will help provide further evidence to support my causal mechanism. I hypothesize that as economic integration increases the global spatial autocorrelation statistic will decrease. At the local cluster level, the number of observations with a high level of defense spending having high defense spending neighbors is inversely related to the level of economic integration.

Three channels could explain this relationship. First, commitment to international economic institutions establishes powerful norms that frame arms-racing and aggressive, war-like postures as unproductive and undesirable. In addition, membership in international institutions creates avenues for states to peacefully communicate and engage with each other. By elevating the collective level of information state have about each other, the effect of the security dilemma is lessened by reducing the amount of uncertainty involved in foreign policy decisions.

Second, commitment to multilateral free trade agreements and economic institutions creates mutual trust among states. This mutual trust erodes the inherent distrust proposed by the

security dilemma argument. Alternatively, the trust channel can be thought of in terms of signals and information asymmetry. States that make policies welcoming FDI, a process driven primarily by domestic politics and lobbying from multinational companies, send costly signals that they are averse to initiating conflict. The signal is costly because FDI is an inelastic, long-term commitment. Inviting more FDI flows also creates information parity among states, such that the intentions behind any military expenditure can be more accurately interpreted within the context of international economic policies, rather than being immediately perceived as hostile.

Third, increasing economic interdependence increases the opportunity cost of forgone economic revenue as a result of going to war. It also increases a willingness to invest in a trade partner's wellbeing. States therefore will try to decrease the likelihood of conflict even if a nearby state increases its defense spending. FDI's long-term nature forces states to reduce hawkish and realpolitik behavior toward other states because multinational firms perceive such behavior as risky in terms of their investments. States are therefore incentivized, from an economic standpoint, to adopt behavior that shuns arms arcing because pacifist behavior attracts far more investment.

Research Method

I will conduct the analysis on a sample of European nations (n = 42) during the time period of 1995-2019. See Figures 7.2 or 7.7 in the Appendix for details. Unlike regions such as Asia and North America, Europe lacks a regional hegemon, where the outsize influence and enormous size of the United States and China, respectively, could skew the data. Europe is also notable for the strength of its regional political and economic institutions. The European Economic Community (EEC), the European Union (EU), and NATO, to an extent, are all powerful institutions. These institutions are partially responsible for the rapid acceleration of FDI flows within Europe in the 1990's, while recent political developments have led to a more fractured political climate in recent years. These trends make the region a prime candidate for understanding the impacts of increasing and decreasing levels of FDI flows. Other world regions that could be included for analysis are the Middle East/North Africa and sub-Saharan Africa. However, the former region is dominated by oil politics, which heavily skews the nature of my independent variable. Sub-Saharan Africa would be a good choice for analysis, but regional institutions have remained relatively weak compared to those in Europe.

I will construct multiple spatial models relating involvement in economic institutions to change in defense spending. The analysis will span the period of 1995 to 2019 in order to capture the growth and expansion of regional European institutions following the Cold War and the weakening of regional institutions in the last decade. For each year the level of FDI flows, along with a panel of control variables, will be calculated for the entire system. In terms of the dependent variable, the Moran's I statistic and the count of threat responsive countries will also be tabulated for each year. Threat responsive countries are defined as countries whose defense expenditure is

higher than average and whose neighbors' defense expenditures are also higher than average. This approach has the advantage of mitigating against the reverse causality issue found in the FDI and conflict literature. While it is difficult to disprove the case that reduced conflict causes increased FDI flows, my choice of variables makes it difficult to argue that the Moran's I value for a system causes a change in FDI flows.

CONTROL VARIABLES & ALTERNATIVE ARGUMENTS

Based on the control variables present in similar studies in the literature (Flores 2011; Goldsmith 2007; George and Sandler 2018; Yesilyurt and Elhorst 2017; Shin and Ward 1999), six control variables are included in the analysis.

GDP growth represents the year-over-year percent growth in overall GDP of a country. Data for GDP growth was obtained from the World Bank ("World Development Indicators" 2021). The inclusion of GDP growth ensures that the trends in defense spending as a percent of GDP are not a function of the yearly change in GDP. Including GDP growth also ensures that economic interdependence is not a function of overall regional economic health, and that trade interconnectivity represents political will to economically integrate with foreign actors.

GDP per capita is the indicator for the overall wealth of a country. Data for GDP per capita was obtained from the World Bank ("World Development Indicators" 2021). The presence of GDP per capita controls for the potential correlation between a country's military expenditure and the increasing or decreasing wealth of the country. Similar to GDP growth, this control variable will ensure that economic integration reflects political will to deepen trade partnership. If either GDP growth or GDP per capita is significantly correlated with the geographic distribution of defense

spending, then a state's perceived aggression could be attributed more to its status as a wealthy or non-wealthy nation rather than its level of economic integration.

Conflict deaths is the count of all deaths per year due to state-based conflicts involving countries within the dataset. Data for conflict deaths was obtained from the Uppsala Conflict Database Program (Gleditsch et al. 2002; Therese and Öberg 2020). An alternative argument using conflict deaths could suggest that countries involved in more intense conflicts would increase their defense spending. Whether attempting to quell an internal conflict, or trying to end an extraterritorial conflict, states are likely to increase their defense spending when involved in more deadly conflicts. States may increase their defense spending around a conflict-affected area to prevent spillover effects, or with the intention to join the conflict and bring about a swift end to it. The alternative argument may therefore suggest that non-conflict affected areas would contain states with low levels of defense expenditure, and conflict affected areas would contain states with high levels of defense expenditure. The conflict deaths variable therefore ensures that the trade interdependency variable remains robust to changes in the level of violent conflicts in which European countries are involved.

Polity is a variable that captures the regime type of a country. Polity ranges from -10 to +10. A score of -10 corresponds to strongly autocratic, while a score of +10 corresponds to strongly democratic. Polity data was obtained from the Center for Systemic Peace's Polity5 Project (Marshall and Gurr 2020). According to Democratic Peace Theory (Oneal and Russett 1999; 1997; Fordham and Walker 2005; M. Doyle 2016; M. W. Doyle 2005), democratic countries tend to spend less on defense than authoritarian countries. Democratic countries may feel less threatened by their democratic neighbors, or perhaps reap fewer political rewards in terms of legitimacy or

the “rally round the flag effect” from maintaining a strong militaristic stance. The polity variable therefore ensures that the economic interdependence variable remains robust to any increasing or decreasing trends in the level of democracy.

Two alternative arguments may arise from the polity variable. First, the number of high defense expenditure countries may be related to the overall polity score. If the polity score trends more democratic, then the number of high defense spending countries may decrease. Western Europe in particular is notable for its high density of strong democratic states. According to Fordham and Walker (2005), democracies tend to spend less on defense than non-democracies. To dispel this argument, the research method used will include regime type as a control variable. Goldsmith (2007) does the same and finds that spatially lagged defense spending is robust to the inclusion of regime type.

Second, the polity score could capture some of the internal politics at play in terms of defense expenditure. Authoritarian countries may spend more on defense than democratic countries because centralized leadership is able to react faster to perceived external threats. Democratic countries, on the other hand, make decisions more slowly due to electoral and bureaucratic politics, so defense expenditure may not represent their reaction to perceived external threats.

NATO participation is the count of countries present in the dataset ($n = 42$) that belong to the NATO alliance in each year. NATO count therefore excludes countries such as the United States and Canada, since they are not present in the dataset. NATO participation controls for the impact of NATO expansion in Europe between 1995 and 2019. NATO expansion could cause alliance members to lessen their defense spending in response to their neighbor’s defense spending

as they feel safer within the alliance system. Data on NATO participation was obtained from the NATO website ("NATO" 2021).

One major alternative argument regarding this variable is that states in formal alliances may not view other states in the alliance network as threatening. In particular, the enduring peace in Western Europe since World War II can be greatly attributed to the security umbrella provided by the U.S. via NATO (Rosato 2016). Since I will conduct my analysis on a sample of European nations, many of the states will belong to NATO. However, Gray (1971) argues that states within alliances do engage in arms racing behavior. As noted in Jervis (1978), the basic assumption behind the security dilemma is that states are never certain of each other's future intentions, thus allowing states to view each other with suspicion even if an alliance exists. Furthermore, the period of analysis occurs after the Cold War. Without the Soviet Union representing a dominant external threat to NATO, it is more difficult to argue that states within an arguably symbolic alliance network will not view each other's intentions with suspicion.

Data Analysis

The motivating question of this analysis is: what impact does the level of economic interdependence have on the geographic pattern of defense spending in Europe between 1995 and 2019? The specific dates of 1995 and 2019 were chosen mainly for the availability of military and economic data. The time period also captures the growth of the European Union in the post-Cold War period and the decline of U.S. commitment to the region during the Obama and Trump administrations. The time period therefore captures long-term trends in the geopolitical environment of Europe while avoiding the effects of highly volatile events such as the dissolution of the Soviet Union. As noted above, the time period also coincides with a rapid increase in the level of FDI flows in the international system. The time period should therefore capture the effect of large changes in FDI flows on the geography of defense spending.

DEPENDENT VARIABLE

The dependent variable of the analysis will be the geographic structure of defense spending in Europe from 1995 to 2019. Geographic structure will be measured in two ways: the Moran's I statistic by year and the number of threat responsive countries by year.

Moran's I is given by the equation:

$$I = (\frac{n}{S_0}) \sum_i \sum_j w_{ij} z_i z_j / \sum_i z_i^2$$

where n is the number of observations in the dataset, in this case $n = 42$, S_0 is the sum of the spatial weights matrix defined by an $n \times n$ matrix of weights w_{ij}, and z is the observation value in standard deviations from the mean at location i or j. The intuition of Moran's I is given by Tobler's *First Law of Geography*: "everything is related to everything else, but near things are more related than

distant things" (Anselin 1996, 122). Moran's I measures the global degree to which observations at location *i* are related to the spatially lagged observations at locations *j*. The weights matrix defines a set of weights, such that each value of w_{ij} is zero when *i* and *j* are not neighbors and nonzero otherwise. The weights matrix is row-standardized, meaning that each row sums to one, and the entire matrix sums to *n*.

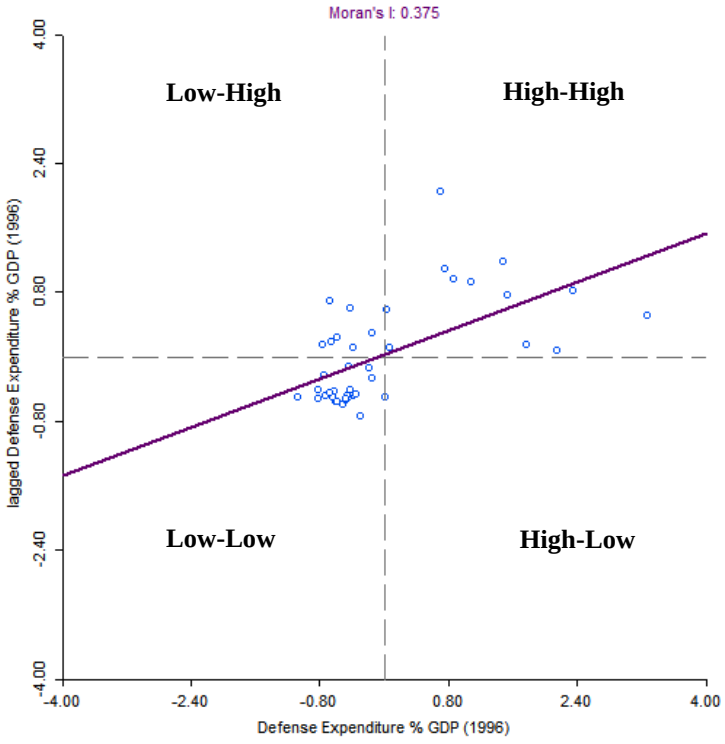
Positive values of Moran's I imply that observations tend to have similar, spatially lagged observations. In other words, the observations at location *i* have neighbors *j* with similar values for their observations. Negative values of Moran's I imply the inverse: location *i* has neighbors *j* with very different observation values. Moran's I values near zero mean that the spatial structure of the data is random, in other words no correlation exists between observations at locations *i* and observations of their neighbors *j*.

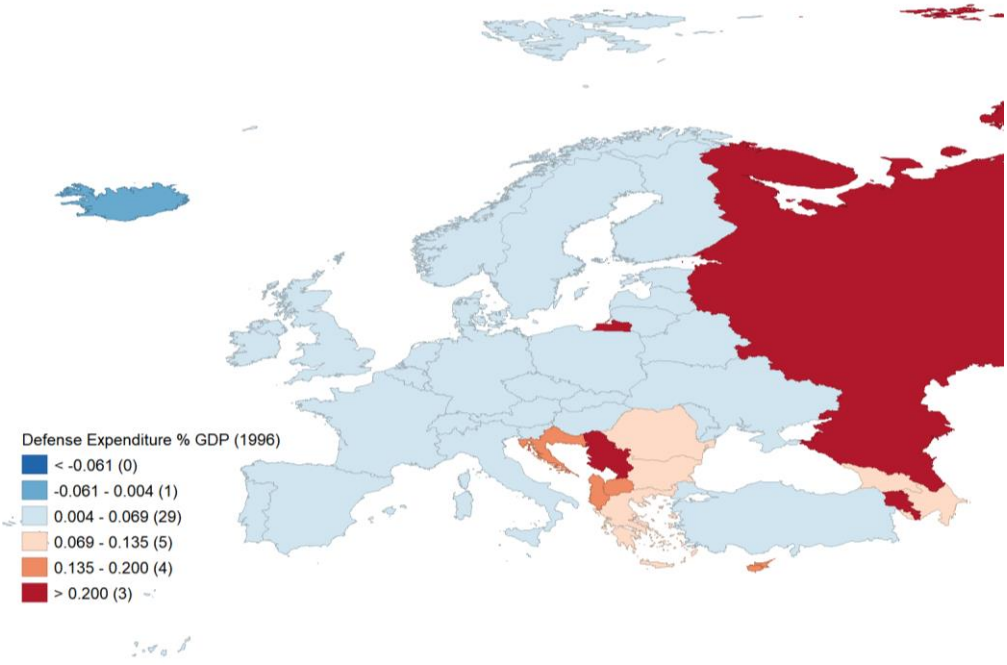
In terms of this analysis, defense expenditure as a percentage of GDP is used to measure defense spending. Given the Moran's I definition above, references to "high" or "low" levels of defense spending means standard deviation values above or below the mean. The data was obtained from the SIPRI Military Expenditure dataset for 2020. A positive Moran's I value implies that the defense spending of a country is correlated with the defense spending of nearby countries. This is the result found in the existing literature for global-level studies (Goldsmith 2007; George and Sandler 2018; Yesilyurt and Elhorst 2017; Shin and Ward 1999). A negative Moran's I value means that a country's defense spending is inversely correlated to that of its neighbors. If a country has a high level of defense spending, then it is likely near countries with low levels of defense spending and vice versa. A neutral, or near-zero, Moran's I value means that no significant spatial autocorrelation exists in the data. Ideally, I hope to measure an inverse correlation between the

Moran's I value and economic interdependence. As interdependence increases, my argument suggests that states will cease to base their defense spending on the level of their neighbor's defense spending, thus leading to a more neutral or negative Moran's I value.

In a Moran's I scatterplot, each point represents an individual observation. For this analysis, the unit of observation is a country. The x-axis corresponds to the country's defense expenditure as a percentage of GDP. The y-axis is the spatially lagged defense expenditure as a percentage of GDP. In other words, whether the country's defense expenditure is higher or lower than its neighboring countries, and by how much. An observation's neighbors are, of course, defined by the weights matrix. Depending on the weighting method and observation, an observation may have between 0 and $n - 1$ neighbors. For example, if a *k*-NN approach is used, then each observation has exactly *k* neighbors, so a point on the Moran's I scatterplot is a one-to-*k* relationship. If another weighting method is used, then each observation may have a different number of neighbors. This analysis will use queen-contiguity weights, meaning that each country does have a variable, but normally distributed, number of neighbors.

Figure 5.1 Moran's I scatterplot and map of defense spending in Europe, 1996





Moran's I scatterplots are divided into four quadrants: high-high, low-low, high-low, and low-high. Observations in the low-low quadrant correspond to countries with low defense spending with low defense spending neighbors. Observations in the low-high quadrant correspond to countries with low defense expenditure with neighbors of high defense expenditure. Observations in these quadrants are of significance since they display behavior contradictory to what might be predicted by defensive realism. Both of these types of observations appear as blue or light blue in the map in Figure 5.1.

Observations in the high-low quadrant are not of great significance because those countries may have higher than average defense spending due to internal politics or localized conflicts. Observations in the high-high quadrant correspond to countries who spend more on defense and are also surrounded by neighbors with high defense spending. These observations are significant because they conform to behavior predicted by defensive realism. These observations appear as orange or red in the map in Figure 5.1.

In addition to measuring the yearly Moran's I value of defense expenditure, a secondary method of measuring the dependent variable will therefore be the count of observations in the high-high quadrant. Again, these will be referred to as *threat responsive* countries. These countries may spend more on defense because their neighbors also spend a higher-than-average amount on defense, and thus they feel imminently threatened by their neighbors. The motivation behind this second measurement lies in the potential of observations in the low-low quadrant to skew the Moran's I value in the positive direction. The presence of low-low quadrant countries aligns with my argument, but will still increase the Moran's I value. Therefore, measuring the number of threat

responsive countries will more accurately capture the relaxation in the spatial structure of defense spending in Europe.

INDEPENDENT VARIABLE

The independent variable in this analysis will be the level of economic interdependence in Europe between 1995 and 2019. FDI flows as a percentage of GDP will be used to operationalize the economic interdependence variable. Foreign direct investment is the amount of investments made by foreign firms into native firms in a foreign country by acquiring assets or establishing business operations (Chen 2021). Dividing by the GDP of the recipient country gives a measure of how important the amount of foreign participation in domestic markets is to a country's economy. Data for both variables were collected from the World Bank ("World Development Indicators" 2021).

By nature of the spatial analysis method, proximity becomes an intervening independent variable. Take State A and State B. If the distance between A and B is large, then the difference between their levels of military expenditure is uninteresting. However, if the distance between A and B is small, then the difference between their levels of military expenditure is noteworthy. As noted above, proximity is already baked into the Moran's I value, so it does not appear as a standalone variable in this analysis.

DATA COLLECTION

Data for each variable was collected by year for each country in the dataset. A total of 42 countries were used for the analysis ($n = 42$). Bosnia and Herzegovina and Kosovo were excluded due to their nonexistence or disputed status for large parts of the timeframe. Certain other microstates were excluded, such as Andorra, Lichtenstein, San Marino, the Vatican, and Monaco. Montenegro was also excluded due to a lack of data availability. Europe was chosen as the region of analysis

because of a lack of outliers. In East Asia and North America, China and the U.S. have outsized militaries and economies in comparison to other countries in the region. In Europe, this dynamic does not exist, with the possible exception of Russia. However, Russia is an important player in the European security scene, so omitting Russia would result in an unrealistic view of the region. Furthermore, if economic interdependence can predict a decrease in high military spending hotspots, the inclusion of Russia could make the results more robust.

Each of the control variables and the independent variable are aggregate-level variables for each year of the analysis, 1995-2019. Trade openness as a percentage of GDP, foreign direct investment as a percentage of GDP, GDP per capita, GDP growth, and polity score values are the means across each of the 42 countries in the analysis for each year. Threat responsive countries and NATO countries are simply counted by year. Conflict deaths is the sum of deaths in conflicts involving European countries by year. Descriptive statistics for all variables can be found in Table 7.1 in the Appendix.

GEOSPATIAL ANALYSIS

To begin the spatial analysis of military expenditure, I attempted to reconstruct the findings in the existing literature. The motivating question of the initial analysis was: is there a clear spatial structure to military expenditure in Europe? In order to conduct the initial analysis and gather the Moran's I values, a spatial weight matrix needed to be constructed.

Three types of spatial weighting strategies can be used to construct a weights matrix: k-nearest-neighbors (*k*-NN), distance-band weights, and contiguity weights (Anselin, Syabri, and Kho 2010). Each type of weight must be constructed using some coordinate representative of the center of the spatial unit. Because some of the countries in the dataset have irregular border shapes

(France, for example, has a geometric centroid located outside of its mainland borders due to its overseas territories), I used the latitude/longitude coordinates of each country's capital city to represent the center of each spatial unit.

k-NN weights are constructed by measuring the distance from each capital to every other capital, then choosing the countries with the *k* shortest distances. Distance-band weights are constructed by choosing the neighbors with capitals that lie within a certain radius of the capital of each country. This analysis used arc-miles and arc-kilometers as the units for distance-band weights. Contiguity weights are based on common edges or vertices between spatial units. Since Europe has highly irregularly shaped countries, I converted the map of Europe into Thiessen polygons. This simplified map of Europe allowed me to create queen-contiguity weights for the dataset based on countries whose Thiessen polygons had shared borders or vertices.

Table 7.3 in the Appendix contains descriptive statistics about the weighting strategies. I settled on using queen-contiguity weights to carry out the analysis. As shown in the maps in Figure 7.2 in the Appendix, the neighbors resulting from using queen weights has an even spread throughout the map, without any overly dense or sparse clusters. The queen weights also resulted in no isolates (observations without any neighbors), and had a roughly normally-distributed number of neighbors per observation. The boxplot in Figure 7.4 in the Appendix shows the distribution of Moran's I statistics from 1995 to 2019 using each type of weights strategy. Although the 4-NN, 500 km distance band, and 500 mile distance band weights all had a good distribution of Moran's I statistics, those three weights resulted in either isolates or a very sparse weights matrix, which harms the robustness of the Moran's I statistic. By contrast, the queen contiguity weights resulted in a wide spread of Moran's I statistics, while representing a realistic

network of neighbors throughout Europe. I attempted to recreate the results of Goldsmith (2007), who also uses contiguity weights. Goldsmith runs a spatial autoregression on the entire world, using both temporally and non-temporally lagged defense spending from 1991. Goldsmith also uses regime type, incidence of interstate war, and incidence of civil war as control variables in subsequent spatial autoregression trials. I differ from Goldsmith's method by restricting my dataset to include only European countries. I do not explicitly consider the control variables in the spatial analysis, but will include variations on Goldsmith's controls, in addition to others, when fitting a linear regression model. Regardless of which, if any, control variables are considered, or whether temporally or non-temporally lagged defense spending is used, Goldsmith finds a significant, positive spatial autocorrelation with respect to defense spending (Goldsmith 2007, 427).

Goldsmith's global Moran's I values range from 0.273 to 0.652 depending on the configuration of the variables used. My results using the Europe-only dataset look similar. From 1995-2019, my Moran's I values range from 0.091 to 0.375, with a median of 0.2. The plots in Figure 7.5 in the Appendix show that the Moran's I analysis for the year 1996 reconstructs Goldsmith's central argument: states nearer to each other tend to respond to each other in terms of military spending than states farther apart. The distance scatterplot visualizes this intuition: as the distance between a pair of states increases, so does the predicted distance between their defense spending values. The correlogram displays this intuition differently: for increasingly larger distance bands to consider neighbors, the resulting Moran's I value decreases. When considering only nearby neighbors, there is strong clustering in terms of defense spending. When considering neighbors farther away, the clustering weakens. At the maximum pairwise distance of 3,500 km,

the Moran's I value is negative, meaning that states have very different levels of defense spending than states very far away from them.

This analysis also departs from Goldsmith's approach by running separate spatial autoregressions for each year from 1995 to 2019. The Moran's I values reach a maximum in 1996 (I = 0.375) and a minimum in 2002 (I = 0.091). The chart in Figure 7.5 in the Appendix shows the trend in Moran's I values over the time period. From 1995 to 2002, the Moran's I statistic drops rapidly, then increases steadily until 2019. The Moran's I scatterplots in Figure 7.6 in the Appendix show the scatterplots for 1996 and 2002. Figure 7.7 in the Appendix contains two maps of Europe corresponding to the Moran's I scatterplots. The maps are colored by the standard deviation values of the defense spending for each country. In the 1996 map, there is a high level of clustering in the Balkans and Caucuses. In the 2002 map, the overall distribution of defense spending has contracted, while the high-high clusters have become less pronounced.

The analysis will also use the number of observations in the high-high quadrant as a dependent variable. Again, this quadrant corresponds to the states who spend higher than average on defense and are spatially correlated (i.e. neighbors of) other states with higher than average defense spending. My argument suggests that these observations should become less frequent as economic interdependence increases, since states become more invested in their neighbor's wellbeing and feel less threatened by them, thus leading to reduced clusters of high defense spending. The graph in Figure 7.8 in the Appendix shows a similar trend as in the Moran's I statistic. The number of threat responsive countries drops from 1995-2010, then sharply rises again until 2019. Again, this indicator captures the relaxation of behavior predicted by defensive realism

that is not captured by the overall Moran's I statistic. This is because the Moran's I statistic can be skewed by observations in the low-low quadrant.

LINEAR REGRESSION

In order to fit a model for the spatial clustering of defense spending and economic integration, two separate regression models will be used. The first will naively use the Moran's I statistic by year as the dependent variable to measure the degree to which European states base their defense spending on their neighbors' defense spending from 1995-2019. The second will improve on this approach by using counts of observations in the high-high quadrant (threat responsive states) as the dependent variable.

The correlations plot in Figure 7.9 in the Appendix shows the degree to which the various control and independent variables are correlated with the Moran's I statistic. Conflict deaths has a large, positive correlation with the Moran's I statistic. This makes sense, as increasing conflict intensity may result in countries clustered around conflict zones spending more on their military. GDP growth has a negligible correlation on Moran's I. The rest of the variables have negative correlations. The polity variable speaks to the logic behind Democratic Peace Theory: as the average level of democracy increases (polity trends positive), the Moran's I statistic trends negative. In other words, states respond to their neighbors' defense spending less when the overall democracy level is high. The negative correlation of NATO also makes logical sense. As NATO expands throughout Europe, its members feel less inclined to base their defense spending on their NATO-member neighbors. FDI and trade openness are also inversely correlated, which provides initial evidence for my argument. As states become more interdependent economically, they are less likely to compete with each other militarily.

The timeseries charts in Figure 7.10 in the Appendix visualize the correlations between Moran's I and the independent and control variables. The charts show a steady increase in GDP growth, GDP per capita, and trade openness over the 1995-2019 time period. Polity, NATO, and FDI seem to mirror the curve of the Moran's I statistic over the time period. Interestingly, there seems to be a strong, positive correlation between trade openness and the Moran's I statistic after 2002. On the other hand, FDI retains a negative correlation with the Moran's I statistic throughout the time period.

The regressions in Table 5.1 use the global average FDI as a percent of GDP by year as the primary independent variable. The Moran's I statistic by year is the dependent variable. Like the trade openness model, there is no significant association between economic interdependence and the level of clustering of defense spending. Again, we see a significant, positive correlation between conflict deaths and the level of defense spending clustering, which accounts for about one-quarter to one-third of the variance in the Moran's I statistic. A graphical interpretation of the models is shown in Figure 7.10 in the Appendix.

Again, the drawback to this approach is that as economic interdependence increases, it is likely that a twofold effect on the Moran's I occurs. First, the number and magnitude of high defense expenditure clusters decreases, which lowers the Moran's I statistic. Second, the number and magnitude of low defense expenditure clusters increases, which raises the Moran's I statistic. Thus, no significant association is found. Instead, we see a logical effect on the Moran's I statistic from the level of conflict intensity. Countries clustered around conflict zones with increasing intensity are likely to increase their defense spending. Furthermore, the magnitude and interpretation of the correlation coefficients can be difficult to understand conceptually. Therefore,

a separate analysis of the data will be conducted using the count of threat responsive countries (observations in the high-high quadrant) instead of the Moran's I statistic.

Table 5.1 Moran's I – FDI model

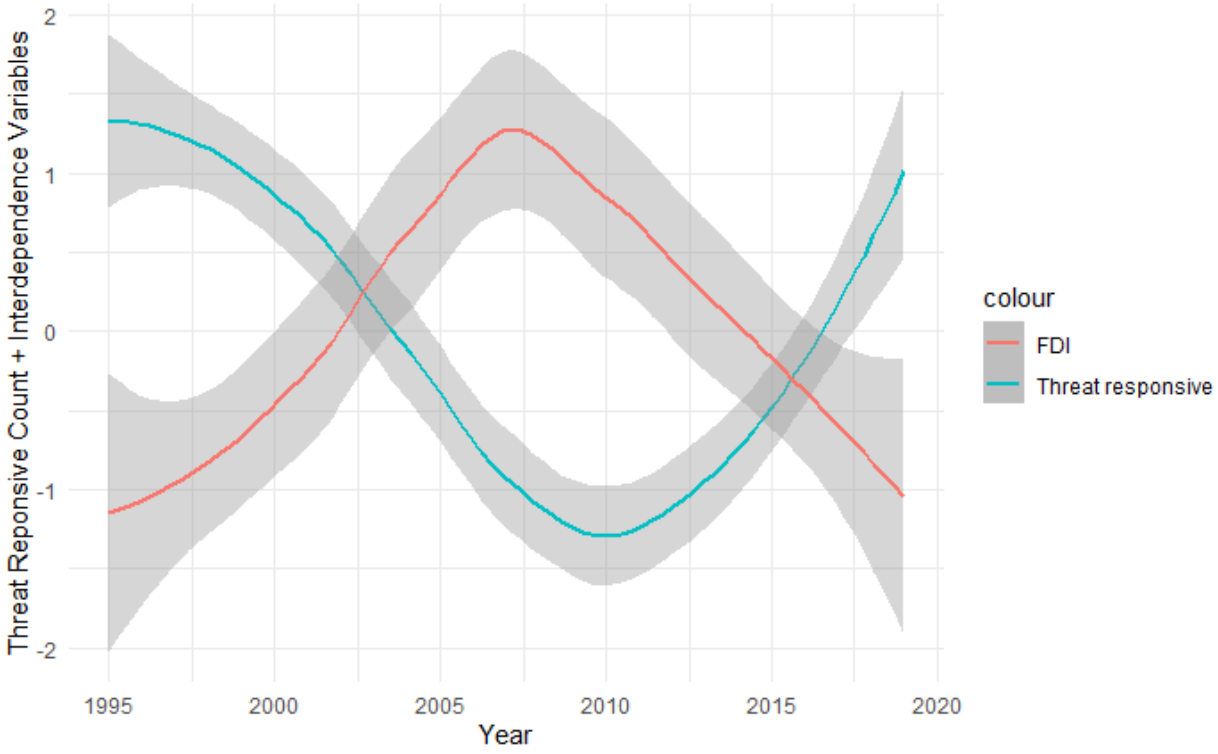
	1	2	3	4
FDI	-0.005 (0.003)	-0.003 (0.003)	-0.001 (0.003)	<0.001 (0.003)
Conflict deaths			<0.001* (<0.001)	<0.001* (<0.001)
NATO			<0.001 (0.003)	-0.008 (0.009)
Polity			-0.008 (0.027)	-0.004 (0.028)
GDP growth		-0.004 (0.007)		-0.006 (0.007)
GDP per capita		<-0.001 (<0.001)		<0.001 (<0.001)
N	42	42	42	42
Adjusted R^2	0.068	0.111	0.292	0.258
p-value	0.11	0.145	0.026*	0.071

Note: Standard error in parentheses. ***, **, *, indicate significance at the 0.001, 0.01, and 0.05 levels respectively.

Conflict deaths has a positive correlation with the number of threat responsive countries. GDP growth has a negligible correlation. The rest of the variables have negative correlations, although their magnitudes are much stronger than in the Moran's I correlations. Again, the same logic is at play. Countries near intensifying conflict zones will collectively spend more on defense. Increasing democracy and the expansion of NATO decreases the number of threat responsive countries as expected. GDP per capita also seems negatively correlated, but the regression models will ideally show that economic interdependence remains robust to GDP per capita's inclusion. Finally, the economic interdependence indicators are also negatively correlated with the number

of threat responsive countries. This is important because it hints at the possibility for these variables to predict a decrease in the number and magnitude of high defense spending clusters. See Figure 7.11 in the Appendix for a graphical representation.

Figure 5.2 Normalized timeseries of FDI flows and level of threat responsive countries from 1995 to 2019.



The timeseries in Figure 5.2 show the trends in the number of threat responsive countries, the economic interdependence indicators, and the control variables over the 1995-2019 time period. The GDP variables and trade openness show a positive trend matching the trend in the number of threat responsive countries from 2010 onward. On the other hand, NATO and FDI display a trend that is more or less inverse to the number of threat responsive countries over the entire time period.

A last round of regressions using FDI as the indicator for economic interdependence is shown in Table 5.2. Across each of the regressions, the FDI indicator for economic interdependence retains a significant, negative association with the number of threat responsive countries. On its own, a 0.278 decrease in the global average FDI level (as a percent of GDP) is associated with a one country increase in the number of threat responsive countries. The FDI variable accounts for 41% of the variance in the number of threat responsive countries. With the inclusion of either the economic or geopolitical control variables, FDI remains significant and negative. As expected, NATO does have a large, negative association with the number of threat responsive countries, but the combined model still results in a significant association between FDI and threat responsive countries as well. The model also accounts for a large portion of the variation in the data, over 60%. This model lends evidence to my argument that increased economic interdependence is associate with less militaristic state behavior.

Table 5.2 Threat Responsive Countries – FDI model

	1	**2**	**3**	**4**
FDI	-0.278*** (0.066)	-0.249*** (0.061)	-0.165* (0.064)	-0.145• (0.071)
Conflict deaths			<0.001 (<0.001)	<0.001 (<0.001)
NATO			-0.218* (0.079)	-0.417* (0.190)
Polity			-0.252 (0.632)	-0.181 (0.609)
GDP growth		0.271• (0.138)		0.097 (0.153)
GDP per capita		<-0.001* (<0.001)		<0.001 (<0.001)
N	42	42	42	42
Adjusted R^2	0.412	0.579	0.597	.633
p-value	<0.001***	<0.001***	<0.001***	<0.001***

Note: Standard error in parentheses. ***, **, *, • indicate significance at the 0.001, 0.01, 0.05, and 0.1 levels respectively.

THE HIGH-LOW QUADRANT

One case that has not been discussed so far in the analysis is the high-low quadrant: states that spend higher than average on defense but whose neighbors spend lower than average on defense. In most years, between zero and two countries existed in this quadrant, which is why it was not discussed in the analysis. The fact that so few states appeared in this quadrant supports my theory: states are less likely to spend arbitrarily high on defense if their neighbors spend very little. Instead, states make their decisions based on signaling. If states send costly signals that their intentions are non-hostile by having a low defense budget and welcoming FDI, then neighboring states should not spend a high amount on defense unless powerful domestic or security-related issues are at play.

One country did consistently appear in the high-low quadrant: Ukraine. Ukraine fits squarely into the exception: all of its neighbors, with the exception of Russia, are low defense spenders. However, Russia poses a very immediate external – and arguably existential – threat to Ukraine, who does not benefit from being under the U.S. security umbrella. Ukraine's defense spending must be heavily linked to Russia's for the sake of its territorial integrity. This kind of defensive realist thinking makes perfect sense in the context of Russia's annexation of Crimea in 2014. Before 2014, Ukraine existed for multiple years in the high-low quadrant, most likely in anticipation of such an event. Ukraine continued to exist in the high-low quadrant after the annexation in response to civil conflict and further aggression from Russia.

The case shows that many factors can simultaneously be responsible for predicting a country's defense budget. In Ukraine's case, the imminent threat of Russia kept its defense spending high.

Other countries bordering Russia, such as Finland, Georgia, Latvia, and Estonia, also face a legitimate security threat from Russia. Despite that, those countries often spent lower than average on defense. To them, costly signals in the form of FDI-welcoming policies from other neighbors may have been more responsible for determining their defense budget than Russia's aggressive posture.

Conclusion & Implications

In the first model, no significant relationship between FDI flow in Europe and the Moran's I coefficient for defense spending is found. Conflict deaths was the only significant predictor of the change in the Moran's I coefficient. This result suggests that patterns of defense spending in local clusters of countries are likely due, in most part, to changes in active conflicts. States near to active conflicts may increase their spending to prevent spillover effects, for example.

However, the second model shows a significant, negative relationship between the level of FDI flows in Europe and the collective level of defense spending. The model suggests that as the level of foreign direct investment increases, the number of threat responsive countries decreases. The result implies that policies enacted by a state to encourage foreign direct investment impact the way neighboring countries interpret the state's military spending.

Furthermore, the results show a sharp increase in the number of threat responsive countries and a sharp decrease in the level of FDI flows between 2010 and 2019. These trends can be explained by the signaling and opportunity cost channels. Initially, as FDI increased and threat responsive countries decreased, the correlation can be explained in two ways. First, as states create more policies that encourage FDI in their country, neighboring states may interpret these policies as costly signals that the state is uninterested in hostile behavior. This is because FDI's long-term nature makes it difficult for states to pivot away from FDI-encouraging policies. If states suddenly become aggressive, investors shy away from investment, and the country's economy suffers. Neighboring states can bank on this logic to assume that a change in that state's defense spending is unlikely to be hostile toward them. Second, as the community of states increase their collective

FDI flows, the opportunity cost of provoking conflict increases. States are therefore collectively less incentivized to increase defense spending.

In the 2010-2019 period, the same logic can be applied to explain why the number of threat responsive countries increased as the level of FDI flows decreased. If a state sheds policies that encourage FDI, the state also loses its ability to communicate its intentions through costly signals. A decline in the efficacy of regional institutions, namely the EU, in part due to Brexit, the refugee crisis, and the Greek debt crisis, may have also weakened the ability to communicate via costly signals. With fewer costly signals, states have less information to form their assumptions of the intentions behind their neighboring states' defense spending. A condition of information asymmetry may arise, prompting states to increase their defense spending in response to their neighbors. Furthermore, the decline of FDI flows also reduces the opportunity cost of hostile behavior. With fewer long-term investments in their economies, states have less to lose if hawkish policies deter investors. So, as the supply of costly information declines and the opportunity cost of forgone investments declines, states are more likely to base their level of defense spending on their neighbors.

The results mostly dispel the alternative arguments about why the number of threat responsive countries fluctuated as it did during the 1995-2019 period. First, the GDP growth and GDP per capita control variables were not significant in any of the models. This finding suggests that FDI flows are not a function of the overall wealth of the region. Instead, FDI flows are more likely the result of domestic-level policies to encourage investment. This finding also dispels the argument that wealthier countries are less likely to be hostile toward one another. As GDP increased throughout Europe, there was no effect on the level of threat responsive countries in the

region. However, an extension to this study could explore how the GDP variables are distributed based on the samples of threat responsive versus non threat responsive countries.

In the first model, the conflict deaths variable is significantly correlated with the Moran's I coefficient. As noted above, states will logically increase defense spending around conflict zones to prevent spillover effects. However, this variable is not significant in the second model, suggesting that conflict deaths does not alter state behavior toward other states. While conflict deaths might have accounted for a few of the threat responsive countries in each year, the overall trend is at odds with the variable meaning that something else accounts for the bulk of the number of threat responsive countries.

The polity variable is also not significant in any of the models. Again, the Democratic Peace Theory (M. W. Doyle 2005; Oneal and Russett 1999; Fordham and Walker 2005) claims that democratic states are able to communicate their intentions more clearly with one another, and therefore appear less threatening to each other. One would therefore expect to see the Moran's I coefficient and the level of threat responsive countries to respond to the polity variable. Instead, no effect is apparent. This finding suggests that the cost signals channel is less likely to originate from an appraisal of a neighboring country's regime type and more likely to originate from the neighboring countries actions, such as creating policies welcoming to FDI.

The alternative argument arising from the NATO variable is more difficult to dispel. The variable was significantly correlated with the level of threat responsive countries in the second model. The alternative argument suggests that as more countries join the NATO alliance, they are less likely to increase defense spending in responsive to each other because they are in the same alliance network, and also receive defense benefits under the U.S. security umbrella. However,

being part of NATO does not account for all of the factors behind a state's defense budget. Crucially, the second model finds that FDI flows are significant even when including the number of NATO countries. Therefore, both dynamics can be at play. States in NATO may spend less on defense because they are part of the U.S. security umbrella, but when FDI levels are low in Europe, states are likely to weigh their NATO membership as less important in their defense cost calculations.

A few broad implications emerge from these findings. First and foremost, encouraging policies that promote foreign direct investment may be able to reduce arms-racing behavior at the regional level. In the long term, adopting such policies can have a stabilizing effect on a region and potentially mitigate future interstate conflict. Conversely, the analysis also showed that declining levels of foreign direct investment in a region is a strong predictor of future destabilization. Indeed, we see a sharp decline in FDI in Europe beginning in 2010 followed by increasingly hawkish behavior. Then in 2014, Russia forcefully annexed Crimea. While there is no evidence to suggest that falling FDI levels had any impact on Russia's decision to invade part of Ukraine, the event worsened the security environment in Europe, which may lead to future hawkish behavior and arms-racing conditions if FDI levels continue to fall.

The evidence does not suggest, however, that FDI has any impact on localized, two-party hostilities. As the case with Ukraine and Russia shows, even though nearly all of Ukraine's neighbors spent very little on defense and FDI levels were high in the pre-2019 period, Ukraine still spent an outsized amount on defense due to its shared border with Russia. Fostering foreign investments between the two nations would not likely have changed the outcome of their relations.

Furthermore, the evidence does not suggest that increasing levels of FDI in the regional system has any impact on reducing intrastate conflict, although this may be an avenue for future research.

The evidence also supports the claim that regional institutions – particularly economic ones – can work to reduce the levels of aggressive postures in a region. By extension, this also supports the liberal internationalist hypothesis that international institutions can mitigate conflict and secure peaceful relations amongst nations. Promoting regional economic institutions can alleviate information asymmetry and hostile behavior by facilitating channels for increasing foreign direct investment. By joining a regional economic institution, states reduce the barriers for native firms to invest in foreign countries and for foreign firms to invest in their own state. It also incentivizes non-participants to join the institution by increasing the opportunity cost of remaining on the outside. Although strengthening regional economic institutions is one mechanism by which the level of FDI in the system can increase, international actors can also strengthen regional economic institutions as a channel to stabilize a region.

Finally, the results imply that the U.S. security umbrella is quite effective at mitigating hostile relations between nations in the alliance network. That being said, providing security is not sustainable. For example, the Balkan states in the analysis often appeared as threat-responsive countries despite many of them gradually joining NATO. When the FDI levels were high, these states did not appear as threat-responsive. However, when FDI levels began to decline, they began to appear in the high-high quadrant again, despite their inclusion under the U.S. security umbrella. Therefore, providing security to a region must go hand-in-hand with economic policies to promote peaceful relations.

A compelling expansion to this analysis would be an extension to other world regions. Although North America was specifically omitted from the potential options due to the outsized influence of the U.S. in the region, sub-Saharan Africa, Central Asia, the Middle East, or South East Asia are all excellent regions to conduct this analysis.

Each of these regions would extend the implications of my theory, if it holds for them. If not, extenuating factors may reveal where levels of FDI may or may not impact state defense spending behavior. In sub-Saharan Africa or Central Asia, a lack of strong regional economic institutions would provide evidence to support the efficacy of the FDI variable in reducing the number of threat-responsive countries in the region. In Europe, the existing institutions may have aided FDI's role in reducing the number of threat-responsive countries. In a region where such institutions do not exist, the level of FDI could become a more or less important predictor of defense spending behavior.

Similarly, extending the study to other regions could reveal whether a pattern of widespread intra- or inter-state conflict can affect whether FDI reduces hostile defense spending patterns. Aside from conflict in the Balkans and Russian aggression, Europe was relatively peaceful in the 1995-2019 period. However, the analysis did show a rapid decline in threat-responsive countries from 1995-2010, suggesting that increasing FDI flows quickly eroded the distrust between NATO and former Soviet bloc states. Applying the analysis to regions with pervasive, ongoing conflicts could shed light on FDI's ability to stabilize volatile regions.

Does the FDI effect still occur when countries suffer from a "resource curse" – where a state's economy is largely reliant on a particular material? In this case, the country may be less able to send costly signals and may have a lower opportunity cost to spend more on defense if FDI

has a lesser impact on the overall health of their economy. Similarly, regions where extractive industries dominate their economies can experience FDI much differently than developed nations. In this context, FDI flows to companies in extractive industries, such as mining or lumber, can have the opposite effect: research suggests that such companies can exacerbate intra- and inter-state conflict (Berman et al. 2017), which can create local clusters of high-defense spending around conflict zones to prevent spillover effects.

In sum, the European case provides a solid foundation to investigate whether FDI flows impact state defense spending behavior. The analysis shows that FDI flows are significantly inversely correlated with the number of threat-responsive countries, suggesting that increasing FDI flows can reduce hawkish or hostile military posturing and reduce the incidence of arms-racing conditions. Further research can uncover whether this theory holds up in less developed regions, regions with asymmetric power dynamics, regions with different economic conditions, or regions with pervasive conflict.

Appendix

Table 7.1 Descriptive statistics of dependent and independent variables

	Min	**Max**	**Mean**	**Median**
Moran's I	0.091	0.375	0.199	0.200
Threat responsive countries *(count)*	5	12	8.48	8
Trade Openness % of GDP *(mean)*	81.57	120.71	102.48	104.18
FDI % of GDP *(mean)*	-0.738	21.005	8.498	7.493
NATO *(count)*	14	26	21.88	24
Conflict deaths *(sum)*	232	15,875	2,390	1,191
GDP per capita *(mean)*	20,149	31,694	26,488	27,626
GDP growth *(mean)*	-4.81	6.29	3.088	3.04
Polity *(mean)*	5.737	8.795	8.295	8.513

Note: the count of countries remains constant (*n = 42*) throughout the timeframe of the analysis (1995-2019)

Figure 7.2 Weighting schemes based on the location of European capital cities: 4-nearest-neighbors (top left), 500 km distance band (top right), 1,000 mile distance band (bottom left), queen contiguity using Thiessen polygons (bottom right).

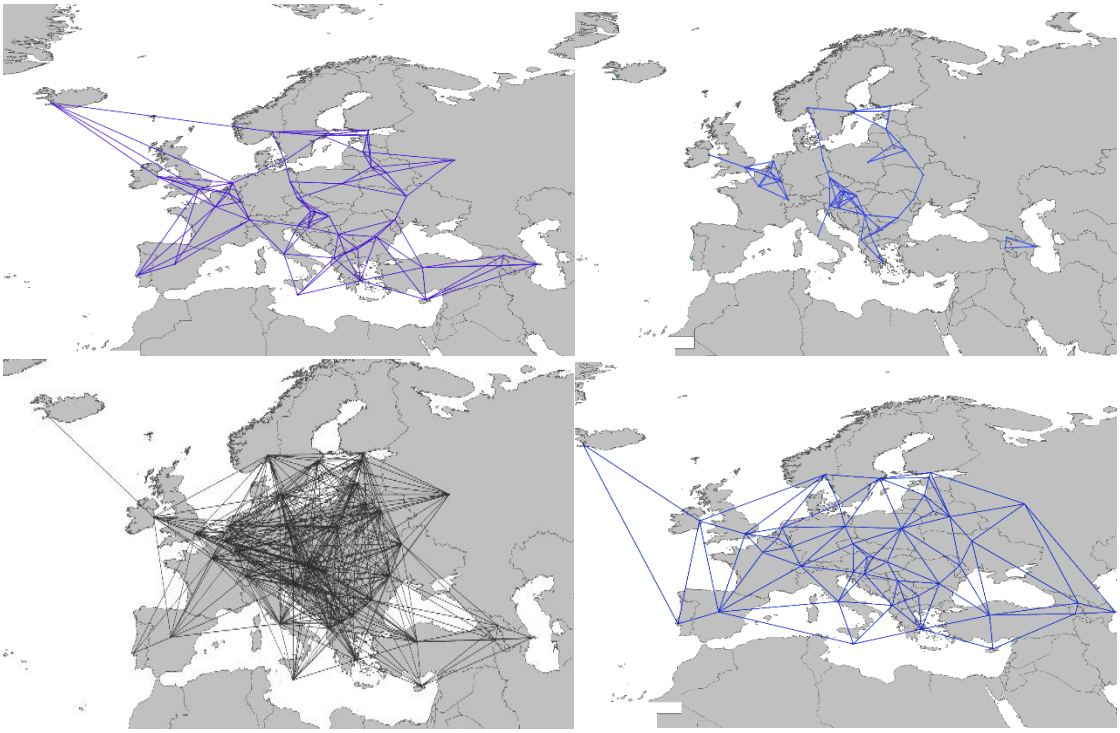


Table 7.3 Descriptive Statistics of Weighting Strategies

	Min Neighbors	Max Neighbors	Mean Neighbors	Median Neighbors	% Non-Zero
4-NN	4	4	4	4	9.52
5-NN	5	5	5	5	11.9
6-NN	6	6	6	6	14.29
7-NN	7	7	7	7	16.67
8-NN	8	8	8	8	19.05
500 km distance-band	0	9	3.19	3	7.6
500 mile distance-band	0	14	7.29	7.5	17.35
1000 km distance-band	0	21	10.9	12.5	25.96
Queen contiguity	2	10	5.24	5	12.47

Note: % non-zero refers to the percentage of the weights matrix filled with non-zero values

Figure 7.4 Distribution of Moran's I statistic for each weighting scheme, 1995-2019

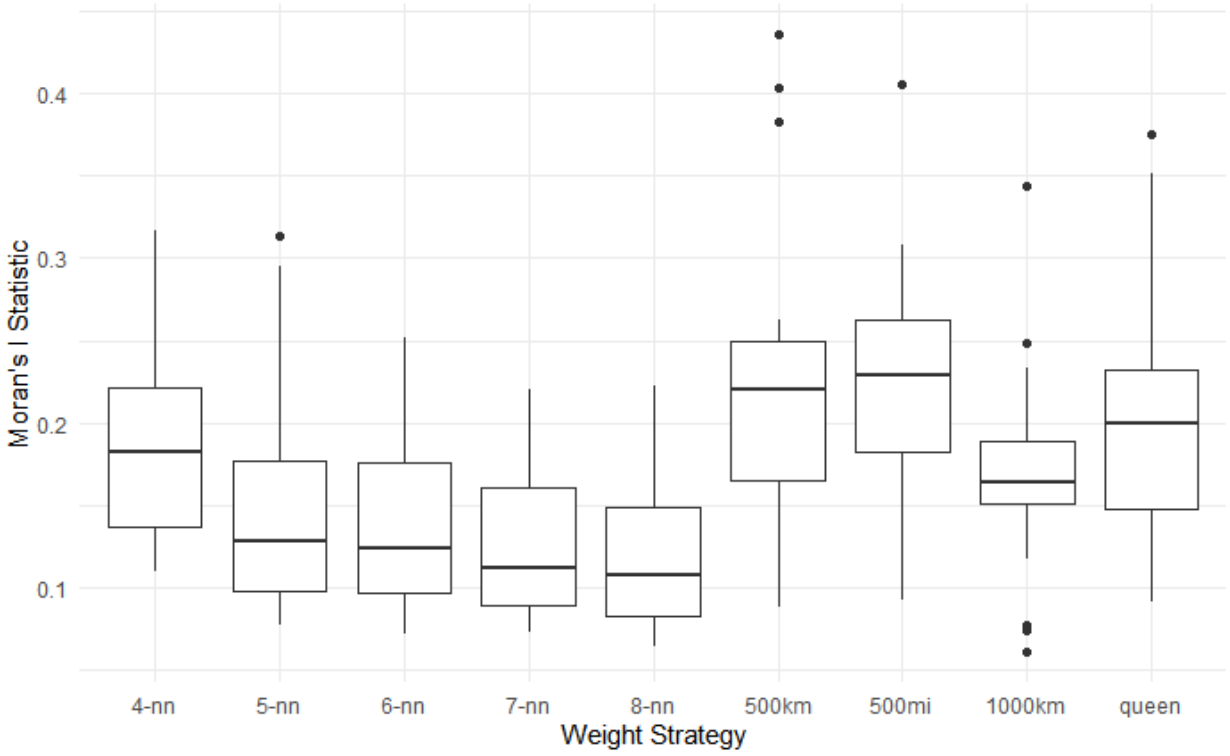


Figure 7.5 Distance scatterplots for the Moran's I statistic from 1995 to 2019 using queen contiguity

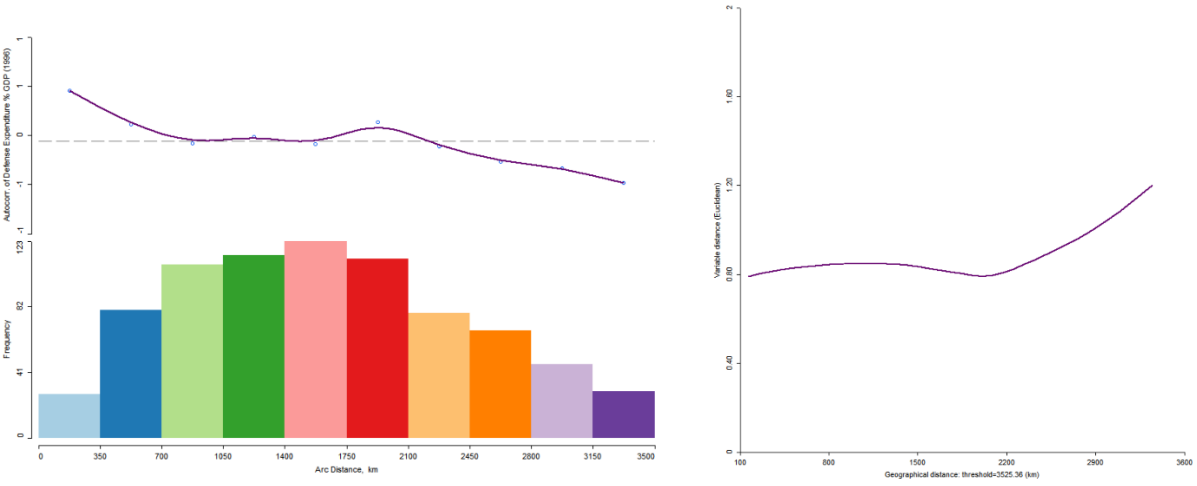


Figure 7.6 Moran's I statistic from 1995 to 2019 using queen contiguity weights and associated scatter plots for 1996 and 2002.

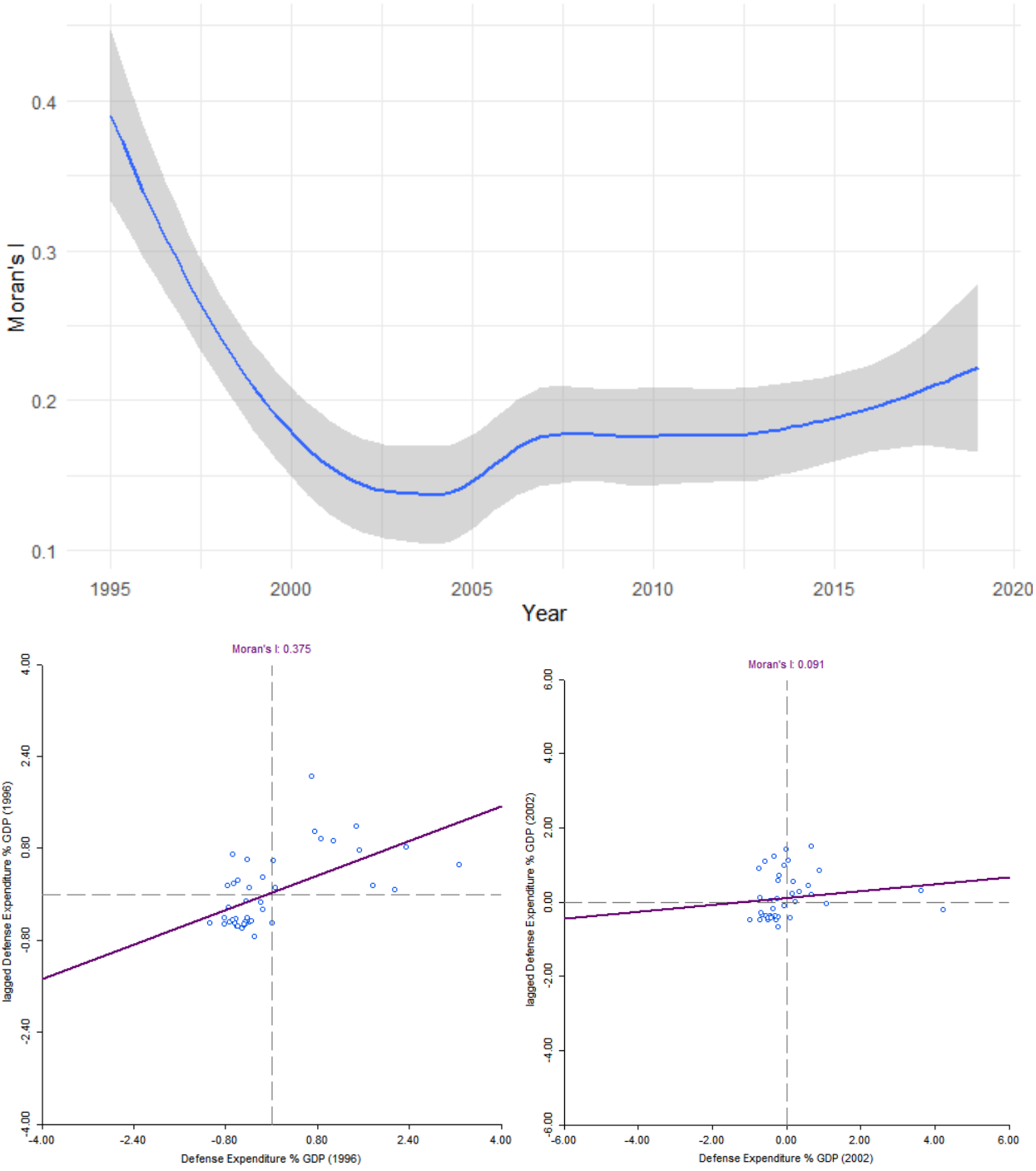


Figure 7.7 Defense spending in Europe colored by standard deviation from the mean in 1996 (top) and 2002 (bottom).

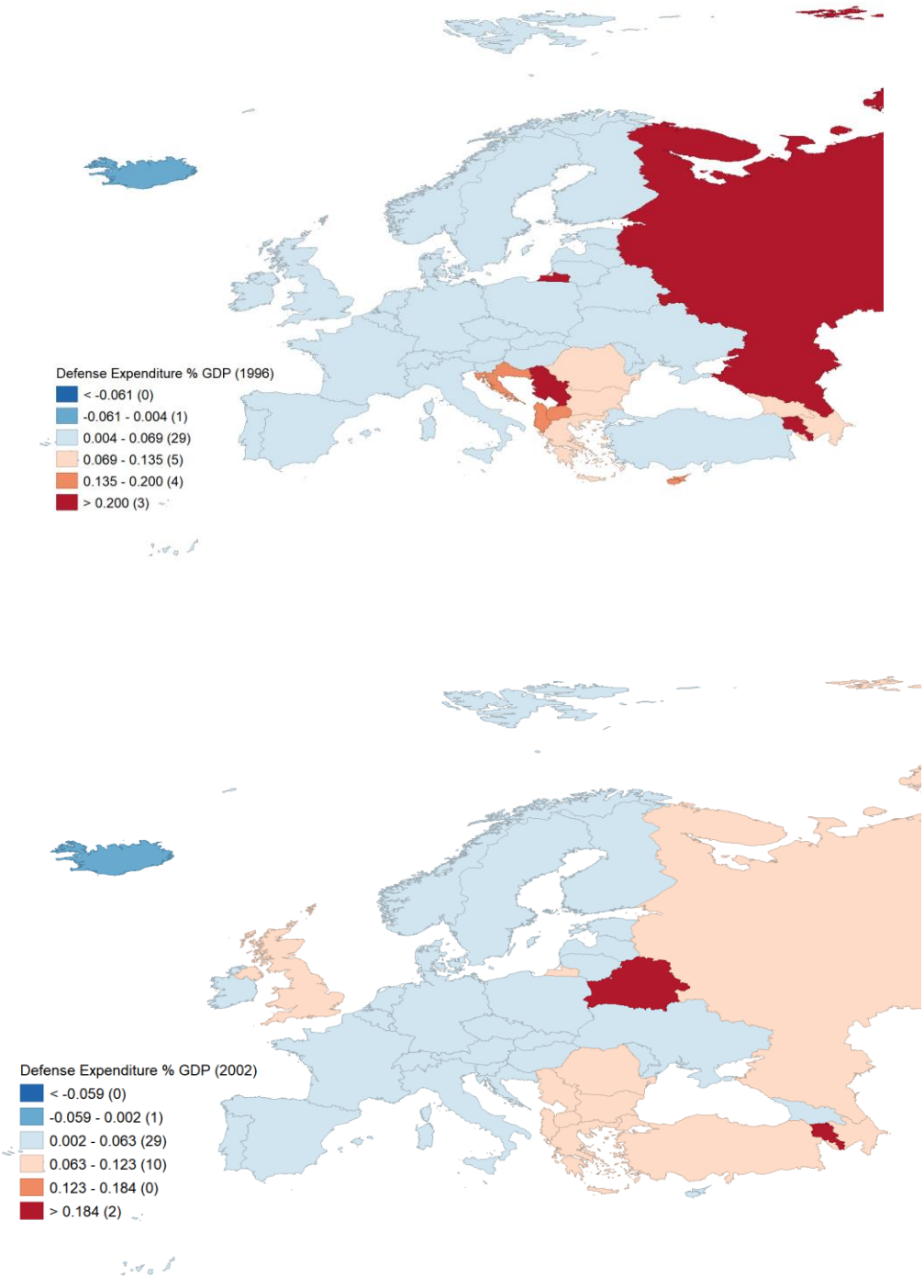


Figure 7.8 Number of threat responsive countries in Europe from 1995 to 2019.

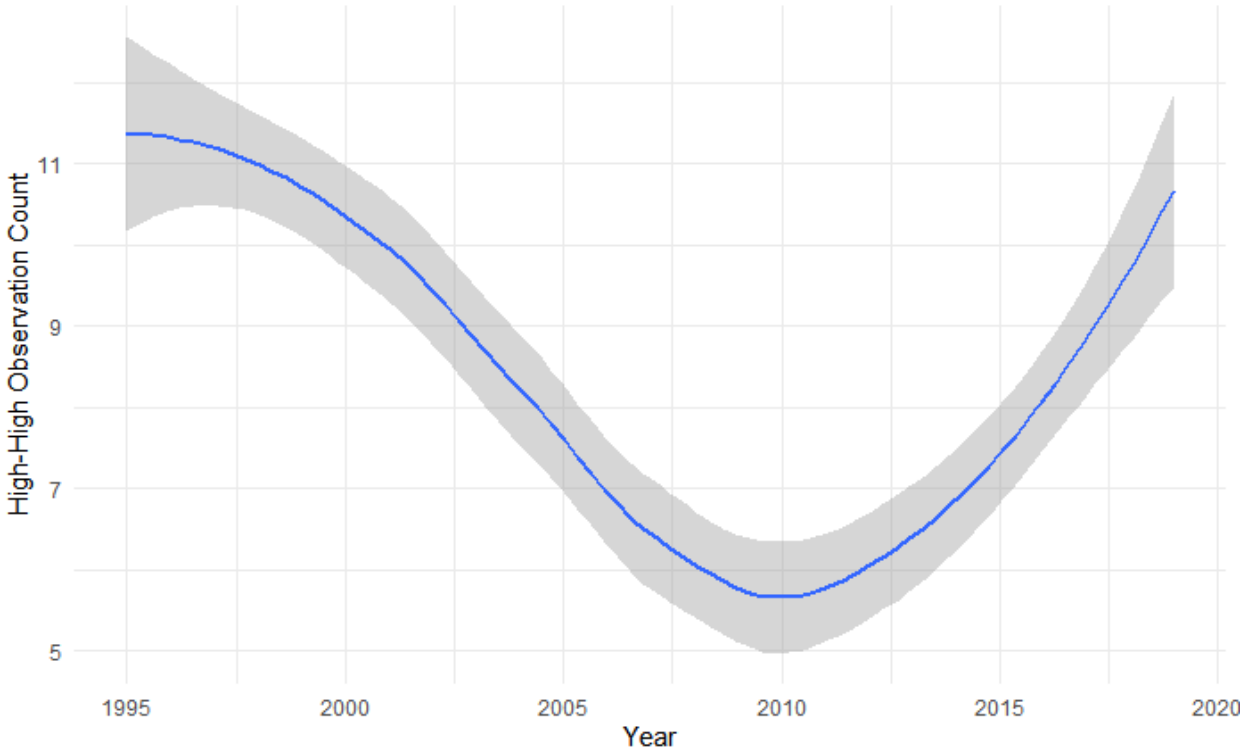


Figure 7.9 Correlation coefficients between control/independent variables and Moran's I.

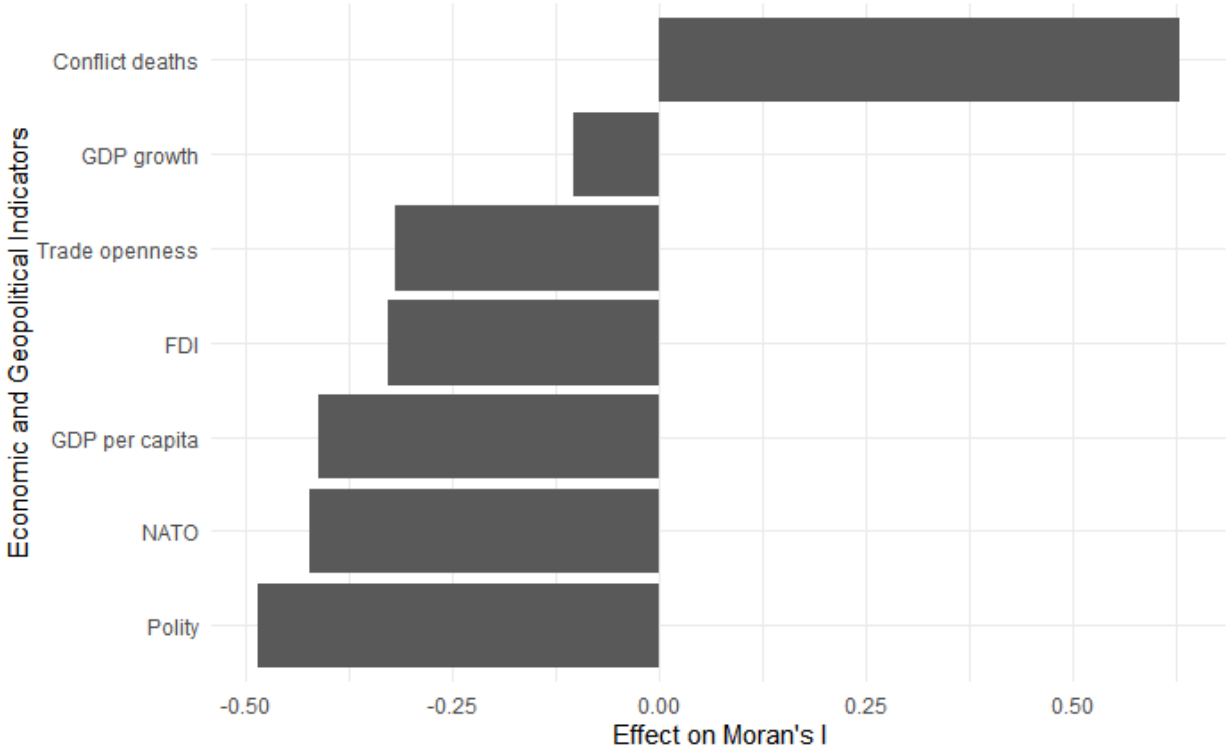


Figure 7.10 Timeseries charts between control variables (top), independent variables (bottom) and

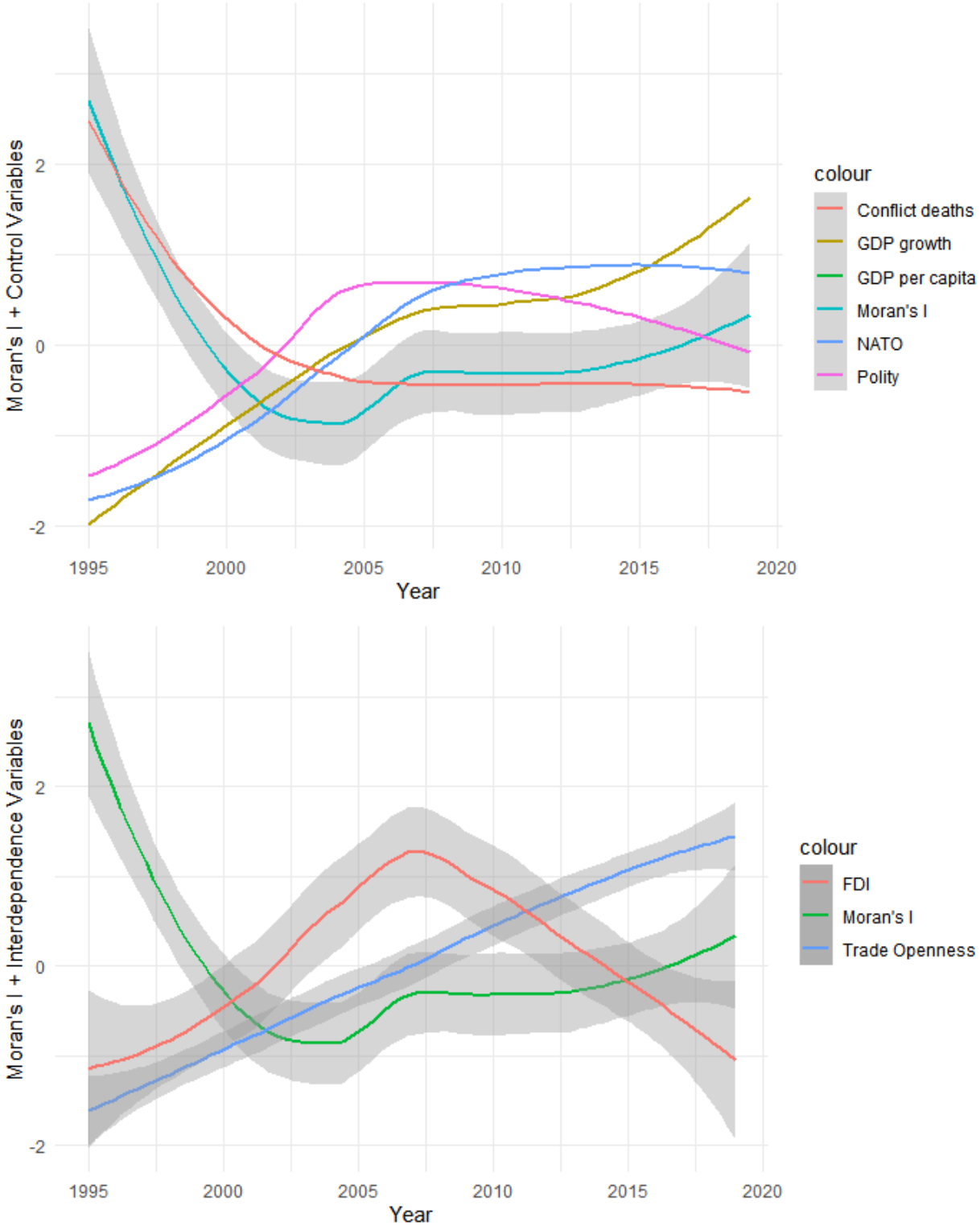
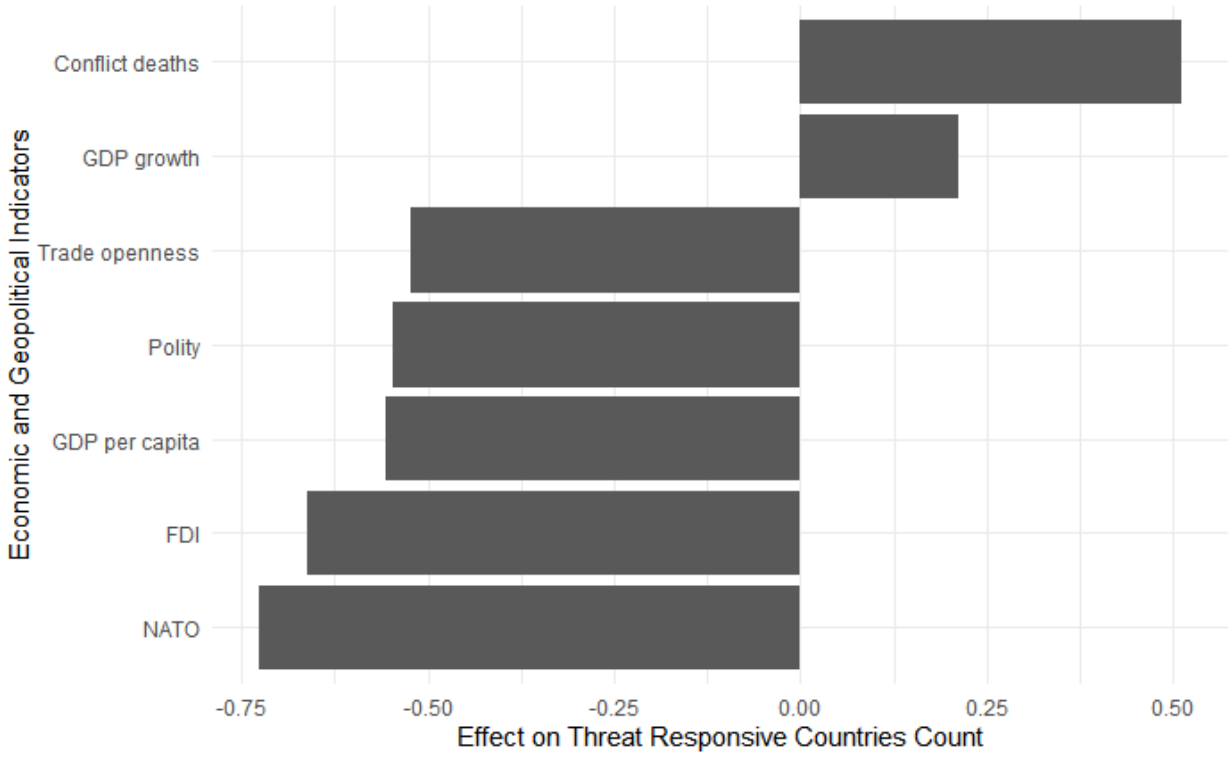


Figure 7.11 Correlations between control/independent variables and level of threat responsive



Bibliography

Anselin, Luc. 1995. “Local Indicators of Spatial Association—LISA.” *Geographical Analysis* 27 (2): 93–115. https://doi.org/10.1111/j.1538-4632.1995.tb00338.x.

Anselin, Luc. 1996. “The Moran Scatterplot as an EDSA Tool to Assess Local Instability in Spatial Association.” In *Spatial Analytical*, by Manfred M. Fischer. Routledge.

Anselin, Luc, Ibnu Syabri, and Youngihn Kho. 2010. “GeoDa: An Introduction to Spatial Data Analysis.” In *Handbook of Applied Spatial Analysis: Software Tools, Methods and Applications*, edited by Manfred M. Fischer and Arthur Getis, 73–89. Berlin, Heidelberg: Springer. https://doi.org/10.1007/978-3-642-03647-7_5.

Barbieri, Katherine. 1996. “Economic Interdependence: A Path to Peace or a Source of Interstate Conflict?” *Journal of Peace Research* 33 (1): 29–49. https://doi.org/10.1177/0022343396033001003.

Barbieri, Katherine. 2002. *The Liberal Illusion: Does Trade Promote Peace?* University of Michigan Press.

Berman, Nicolas, Mathieu Couttenier, Dominic Rohner, and Mathias Thoenig. 2017. “This Mine Is Mine! How Minerals Fuel Conflicts in Africa.” *American Economic Review* 107 (6): 1564–1610. https://doi.org/10.1257/aer.20150774.

Bussmann, Margit. 2010. “Foreign Direct Investment and Militarized International Conflict.” *Journal of Peace Research* 47 (2): 143–53. https://doi.org/10.1177/0022343309354143.

Chen, James. 2021. “Foreign Direct Investment (FDI).” Investopedia. 2021. https://www.investopedia.com/terms/f/fdi.asp.

Copeland, Dale C. 1996. “Economic Interdependence and War: A Theory of Trade Expectations.” *International Security* 20 (4): 5–41. https://doi.org/10.2307/2539041.

Diehl, Paul F. 1985. “Arms Races to War: Testing Some Empirical Linkages.” *Sociological Quarterly* 26 (3): 331–49.

“Distance-Band Spatial Weights.” Accessed May 4, 2021. https://geodacenter.github.io/workbook/4b_dist_weights/lab4b.html.

Doyle, Michael W. 2005. “Three Pillars of the Liberal Peace.” *The American Political Science Review* 99 (3): 463–66.

Flores, Alejandro Quiroz. 2011. “Alliances as Contiguity in Spatial Models of Military Expenditures.” *Conflict Management and Peace Science* 28 (4): 402–18.

Fordham, Benjamin O., and Thomas C. Walker. 2005. “Kantian Liberalism, Regime Type, and Military Resource Allocation: Do Democracies Spend Less?” *International Studies Quarterly* 49 (1): 141–57.

Gartzke, Erik, and Quan Li. 2003. “Measure for Measure: Concept Operationalization and the Trade Interdependence-Conflict Debate.” *Journal of Peace Research* 40 (5): 553–71. https://doi.org/10.1177/00223433030405004.

George, Justin, and Todd Sandler. 2018. “Demand for Military Spending in NATO, 1968–2015: A Spatial Panel Approach.” *European Journal of Political Economy* 53 (July): 222–36. https://doi.org/10.1016/j.ejpoleco.2017.09.002.

Glaser, Charles L. 2000. “The Causes and Consequences of Arms Races.” *Annual Review of Political Science* 3: 251–76.

Gleditsch, Nils Petter, Peter Wallensteen, Mikael Eriksson, Margareta Sollenberg, and Håvard Strand. 2002. “Armed Conflict 1946-2001: A New Dataset.” *Journal of Peace Research* 5 (39).

Goldsmith, Benjamin E. 2007. “Arms Racing in ‘Space’: Spatial Modelling of Military Spending around the World.” *Australian Journal of Political Science; Abingdon* 42 (3): 419. http://dx.doi.org.proxy.uchicago.edu/10.1080/10361140701513562.

Gray, Colin S. 1971. “The Arms Race Phenomenon.” *World Politics* 24 (1): 39–79. https://doi.org/10.2307/2009706.

Ikenberry, G. John. 1999. “Institutions, Strategic Restraint, and the Persistence of American Postwar Order.” *International Security* 23 (3): 43–78. https://doi.org/10.1162/isec.23.3.43.

Jervis, Robert. 1978. “Cooperation under the Security Dilemma.” *World Politics* 30 (2): 167.

Keohane, Robert. 1984. *After Hegemony: Cooperation and Discord in the World Political Economy*. Princeton University Press. http://www.jstor.org/stable/j.ctt7sq9s.

Kydd, Andrew. 2000. “Arms Races and Arms Control: Modeling the Hawk Perspective.” *American Journal of Political Science* 44 (2): 228–44.

Lee, Hoon, and Sara McLaughlin Mitchell. 2012. “Foreign Direct Investment and Territorial Disputes.” *Journal of Conflict Resolution* 56 (4): 675–703. https://doi.org/10.1177/0022002712438348.

Li, Quan, and Tatiana Vashchilko. 2010. “Dyadic Military Conflict, Security Alliances, and Bilateral FDI Flows.” *Journal of International Business Studies* 41 (5): 765–82. https://doi.org/10.1057/jibs.2009.91.

Mansfield, Edward Deering, and Brian M. Pollins. 2009. *Economic Interdependence and International Conflict: New Perspectives on an Enduring Debate*. University of Michigan Press.

Marshall, Monty G., and Ted Robert Gurr. 2020. “Polity5 Project.” Center for Systemic Peace. 2020. https://www.systemicpeace.org/inscrdata.html.

Martin, Philippe, Thierry Mayer, and Mathias Thoenig. 2008. “Make Trade Not War?” *The Review of Economic Studies* 75 (3): 865–900. https://doi.org/10.1111/j.1467-937X.2008.00492.x.

Mearsheimer, John J. 1994. “The False Promise of International Institutions.” *International Security* 19 (3): 5–49. https://doi.org/10.2307/2539078.

NATO. 2021. http://www.nato.int/cps/en/natohq/index.htm.

North, Douglass C. 1971. “Institutional Change and Economic Growth.” *The Journal of Economic History* 31 (1): 118–25.

Oneal, John R. 2003. “Measuring Interdependence and Its Pacific Benefits: A Reply to Gartzke & Li.” *Journal of Peace Research* 40 (6): 721–25. https://doi.org/10.1177/00223433030406007.

Oneal, John R., and Bruce Russett. 1999. “The Kantian Peace: The Pacific Benefits of Democracy, Interdependence, and International Organizations, 1885-1992.” *World Politics* 52 (1): 1.

Oneal, John R., and Bruce M. Russett. 1997. “The Classical Liberals Were Right: Democracy, Interdependence, and Conflict, 1950-1985.” *International Studies Quarterly* 41 (2): 267.

Polachek, Solomon, Carlos Seiglie, and Jun Xiang. 2005. “Globalization and International Conflict: Can FDI Increase Peace?” *Defense and Peace Economics.*, October.

Polachek, Solomon, Carlos Seiglie, and Jun Xiang†. 2007. “The Impact of Foreign Direct Investment on International Conflict.” *Defence and Peace Economics* 18 (5): 415–29. https://doi.org/10.1080/10242690701455474.

Rider, Toby J. 2009. “Understanding Arms Race Onset: Rivalry, Threat, and Territorial Competition.” *The Journal of Politics* 71 (2): 693. http://dx.doi.org.proxy.uchicago.edu/10.1017/S0022381609090549.

Rosato, Sebastian. 2005. “Explaining the Democratic Peace.” *The American Political Science Review* 99 (3): 467–72.

Rosato, Sebastian. 2016. *Europe United: Power Politics and the Making of the European Community*. Cornell Studies in Security Affairs. Ithaca: Cornell University Press. http://pi.lib.uchicago.edu/1001/cat/bib/12369317.

Shin, Michael, and Michael D. Ward. 1999. “Lost in Space.” *The Journal of Conflict Resolution; Beverly Hills* 43 (6): 793–817.

“SIPRI Military Expenditure Database.” 2020. SIPRI. 2020. https://www.sipri.org/databases/milex.

Therese, Pettersson, and Magnus Öberg. 2020. “Organized Violence, 1989-2020.” *Journal of Peace Research* 4 (57).

“World Development Indicators.” 2021. World Bank. https://databank.worldbank.org/source/world-development-indicators.

Yesilyurt, M Ensar, and J Paul Elhorst. 2017. “Impacts of Neighboring Countries on Military Expenditures: A Dynamic Spatial Panel Approach.” *Journal of Peace Research* 54 (6): 777–90. https://doi.org/10.1177/0022343317707569.