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The Structure of Global Economic Integration and Conflict

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The Structure of Global Economic Integration and Conflict

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The Structure of Global Economic Integration and Conflict

by

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Empirical examinations have reached a number of conclusions regarding the relationship between global economic integration and interstate conflict. Most studies find that increased economic relations dampen the likelihood of interstate violence. Yet these studies have focused largely on bilateral trade measures and domestic-level causal mechanisms. In this paper I take the discussion to the structural level and construct systemic variables for global economic openness and concentration. I then test the relationships among these variables and international conflict using an autoregressive model and event count regression methods. The outcomes suggest that high levels of hegemonic protection and global economic concentration are associated with low levels of systemic violence, a finding that runs counter to much of the existing empirical and theoretical literature surrounding the international market and conflict.

Table of Contents

Section I: Introduction.....	1
Section II: Global Economy and Conflict.....	3
Section III: Model Design.....	12
Dependent Variable.....	12
Key Explanatory Variables.....	15
Additional Variables.....	20
Methods, Model, and Hypotheses.....	22
Results and Discussion.....	24
Section IV: Conclusion.....	31
Appendix: Handling Time.....	33
Bibliography.....	35

List of Figure and Tables

Figure 1: Expansion of the World Economy (1860-2000).....	6
Figure 2: Wars in the International System (1860-2000).....	13
Figure 3: Global Economic Concentration and Protection Rates (1860-2000).....	13
Figure 4: Economic Hegemon Tariff Rates (1865-2000).....	16
Figure 5: Average Tariff Rates of the Top Three Economies (1865-2000).....	16
Figure 6: Economic Hegemon Concentration of Top Three Economies (1860-2000)...	18
Figure 7: Economic Hegemon Concentration of Total World Economy (1860-2000)....	18
Figure 8: Global Economic Concentration of the Top Three Economies (1860-2000)...	19
Table 1: Global Economic Hegemons (1860-2000).....	20

I. Introduction

This paper asks the question: *Under what global economic conditions does the probability of interstate conflict increase and decrease?* This is of course not a new question within the study of international politics. Thucydides wrestled with it, just as the National Security Council does today. In fact as we ride this latest wave of globalization, nearly everyone has an opinion or column on how the integration of economies influences individual and national outcomes.¹ The conventional wisdom associated with the relationship assumes that as states integrate their markets into the global economic web, the likelihood of violence decreases. Specifically, economic interdependence often sits alongside democracy and international institutions as a mechanism for global peace.²

Analysts have examined these claims using quantitative dyadic approaches that incorporate bilateral trade levels. Although a few analyses reach the opposite conclusion, the majority of these studies support the claim that global economic integration and dependence promotes peace between states. In the following section I discuss why these approaches, although quantitatively impressive, miss the mark. First, I argue that they limit our understanding of economic openness by measuring trade alone, rather than examining other economic openness indicators such as tariffs. Second, I submit that most of these studies fail to capture the structural component of the global economic-conflict discussion. Instead of examining dyadic bilateral trade flows and domestic-level variables, I suggest we take the discussion to the level where the integration is occurring, the structural level.

¹ Friedman, *The Lexus and the Olive Tree*.

² Russett and Oneal, *Triangulating Peace: Democracy, Interdependence, and International Organizations*.

In the third section I construct variables for two structural economic concepts – *openness* and *concentration* – and examine their influences on the outbreak and continuance of international war and Militarized Interstate Disputes (MIDs). I then test the relationships among these variables and international conflict using an autoregressive model and event count regression methods. Contrary to popular claims, open markets are not always associated with peace. In fact the results indicate that increased hegemonic protection decreases the probability of interstate violence. Moreover, I find that the concentration of the global economy plays a significant role in the likelihood of peace among states. High levels of global economic concentration, in particular, are associated with low levels of conflict. In the final section I offer future research paths along this dimension and discuss the broader endogeneity between war and peace.

II. Conflict and the Global Economy

The dependent variable in this analysis is interstate conflict during the period 1860-2000. Conflict here is both war and MIDs. Indeed an endless number of independent variables can and likely have influenced interstate violence during this period. As the introduction touched on, studies have argued that economic relationships in particular have either increased or decreased the odds of conflict. Chief among analytical efforts in the economic-conflict tradition is the branch of empirical and theoretical research surrounding the notion of economic interdependence and its effects on the likelihood of violence between states.³

One branch of study in this domain finds that increased interstate economic relations can exacerbate the probability of conflict. Analysts have argued from an empirical standpoint that economic interdependence, as measured by monadic and dyadic trade flows, raises the likelihood of interstate violence.⁴ From a theoretical standpoint, states that interact more on economic terms simply may have more to argue over and thus fight over.⁵ Other scholars note that benefits from international economic relations and integration among states are rarely equally distributed.⁶ The “core” is likely to gain more than the “periphery “ or “semi-periphery” and hence tension may arise, perhaps even from the “highest form of capitalism” – imperialism.⁷ Specialization, resulting from economic globalization, may also reduce the “capacity of violence” within states and thus

³ For a survey of this literature, see Mansfield and Pollins, “Interdependence and International Conflict.”

⁴ See Barbieri, *The Liberal Illusion* and other works by Barbieri.

⁵ Waltz, “The Myth of National Interdependence.”

⁶ Hirschman, *National Power and the Structure of Foreign Trade*.

⁷ Wallerstein, “The Rise and Future Demise of the World Capitalist System”; V.I. Lenin, *Imperialism, the Highest Stage of Capitalism*.

decrease their ability to signal credible threats during diplomatic bargaining scenarios.⁸ Moreover, prosperity from economic globalization and interdependence can increase the probability of conflict at a domestic level:

When trade is deteriorating and when unemployment is increasing the mood of governments tends to be cautious or apprehensive. Dwindling revenue and soaring claims for the state's aid aggravate the mood. On the other hand, when prosperity is high – and this is the time most dangerous to peace – there comes a sense of mastery of the environment.⁹

A larger, more conventional branch of international economic and conflict research finds that increasing the level of interstate economic integration and dependency in fact reduces the likelihood of states resorting to violence.¹⁰ Causal logics include the notion that violence simply becomes too costly. Hence interrupting economic markets through the use of force has a net negative payoff in a rational choice sense. Global economic integration also reduces the likelihood of states pursuing territorial expansion as a means of acquiring scarce resources or factors of production, according to scholars. Interconnected economies operating under laws of specialization can maximize their economies and achieve economic objectives without a resort to force.¹¹ Further, in the context of interstate bargaining, states now have additional (economic) mechanisms for signaling and injecting more information into bargaining processes, thereby increasing the probability that states will reach a pre-war negotiated settlement.¹²

⁸ Rowe, "The Tragedy of Liberalism"; On the economic concept of specialization, see Krugman and Obstfeld, *International Economics*.

⁹ Blainey, *The Causes of War*, 93.

¹⁰ The literature on this point is massive. For a starting point, see Mansfield and Pevehouse, "Trade Blocs, Trade Flows, and International Conflict"; Oneal, et al., "Empirical Support for the Liberal Peace"; Oneal and Russett, "The Classical Liberals Were Right"; and Russett and Oneal, *Triangulating Peace: Democracy, Interdependence, and International Organizations*.

¹¹ Rosecrance, *The Rise of the Trading State*.

¹² Gartzke et al., "Investing in the Peace" and Morrow, "How Could Trade Affect Conflict."

Other analysts see the global economic-conflict field of study as more of a mixed bag. True, interdependent economies and states may have more to fight over and thus engage in violence more often than autarkic economies, but the level and intensity of such interdependent conflict may actually be lower than when divorced economies fight.¹³ On the empirical end, scholars note the range of “variable construction” within the interdependency literature. Different constructs for operationalizing “dependency,” “openness,” and other variables that allow for the conceptualization of global economic integration lead to different outcomes regarding conflict.¹⁴ Likewise, the specification of the dependent variable, conflict, is equally contentious and broad in its empirical approaches.¹⁵ Even under like variable constructs, alternative modeling specifications and analytical methods have produced competing results.¹⁶

Finally, analysts have even emphasized the general insignificance of economic relations between states as a key determinant of violence. Instead they point toward power polarity, alliance structure, and technological advances in military hardware as key explanatory concepts behind the outbreak of interstate conflict.¹⁷ States engaged in conflict with one another may even go so far as to sustain their pre-war economic relations and trade flows.¹⁸

These differences in scholarly outcomes and approaches highlight the ambiguity surrounding the broader theoretical understanding and definition of global economic integration and its effects on the likelihood of conflict. Unfortunately this paper fails to

¹³ Pevehouse, “Interdependence Theory and the Measurement of International Conflict.”

¹⁴ Gartzke and Li, “Measure for Measure.”

¹⁵ Pevehouse, “Interdependence Theory and the Measurement of International Conflict.”

¹⁶ Pevehouse, “Interdependence Theory and the Measurement of International Conflict.”

¹⁷ Buzan, “Economic Structure and International Security.”

¹⁸ Barbieri and Levy, “Sleeping with the Enemy.”

resolve this definitional issue. It does, however, submit that interstate economic integration is at its core a global or “structural” concept. We could easily assume that economic integration is strictly a series of bilateral relationships occurring only at the paired level. But given the growth and expansion of the world economy during the past two centuries, as Figure 1 indicates, this would be a suspect assumption.

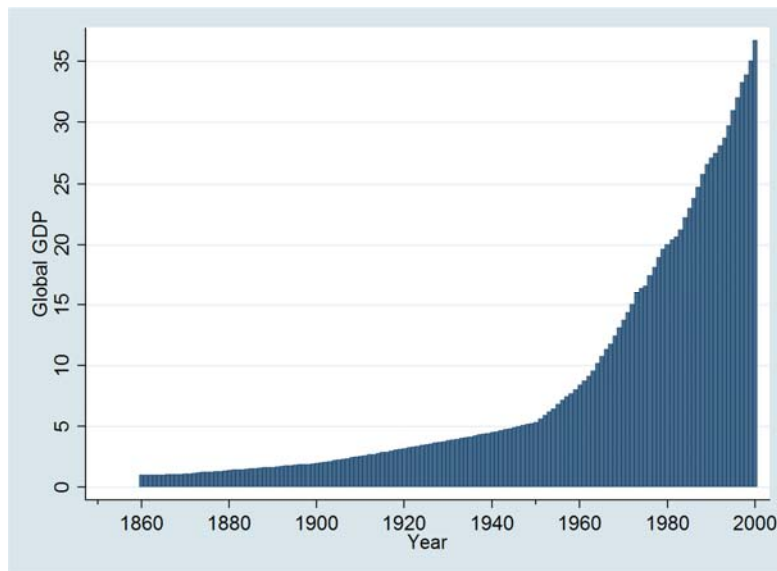


Figure 1. Expansion of the World Economy (1860-2000)¹⁹

Surprisingly, therefore, one concept the above literature generally agrees on is the use of domestic and dyadic levels of analysis. Bilateral relationships in these studies represent the degree to which economic interdependence influences conflict. Indeed at an empirical level the use of dyads is appealing. In part this is because they allow for infinite-N logit and probit fixed effects models that can incorporate a range of domestic level variables and produce statistically significant quantitative results. In such cases,

¹⁹ Source: Maddison, *Contours of the World Economy 1-2030 AD*.

using a host of variables constructed from import, export, and GDP estimates produces a tangible measure of the degree to which a state is integrated and dependent upon the broader economy. One can then use these variables to understand the effect of global economic openness on the likelihood of interstate conflict.

Yet economic integration is just as much, if not more, of a global concept than a dyadic concept. And war rarely occurs between states; it occurs among them. Most of the analytical efforts in the interstate economic-conflict domain, however, continue to sit within the domestic and dyadic levels of analysis. In addition, the majority of these studies focus specifically on trade flows as a measure of economic openness.²⁰ But state economies are comprised of significantly more than just trade. Monetary relations, for example, account for much of the economic integration occurring among states, particularly in the post-World War II period. Furthermore, tariff and non-tariff barriers to trade clearly capture a state's willingness to "open" its economy.

Thus the existing literature surrounding the effects of interstate economic relations on conflict is vast in a publication sense, but relatively homogeneous and narrow in variable construction, model specification, and level of analysis perspectives. Consequently, there is a clear need for structural level and non-trade analyses. In an effort to move the discussion toward this gap, this analysis explores the role of tariffs and the structural side of the global economy-conflict model. It focuses on two structural concepts of the global economy – *concentration* and *openness*.

²⁰ For a survey of the prominent measures of openness, share, and dependency variables focusing on dyadic trade flows, see Gartzke and Li, "Measure for Measure," 555.

Structure

Structure here “means the form of the interrelationships of the states composing the international system.”²¹ In one sense, structure is an important concept to consider when analyzing interstate relationships in any capacity and hence is relevant to this study. Perhaps when examining previous eras of global economic relations such a systemic approach would have less validity, given that the world market was less of a single, integrated system than a number of disparate and independent *systems*. In the modern era, however, the speed with which economic exchange and integration moves leaves nominal doubt to the existence of a global economy.²²

In a more refined sense, examining structure is appropriate for understanding the interstate economy-conflict question because of its independent effect on the strategic portfolios of states and thus on their solution sets. Borrowing from microeconomic theories of the firm, market dynamics demonstrate this structural influence. Under monopolistic, duopolistic, oligopolistic, and other market structures, firms face unique sets of structural constraints with regard to their strategic market choices and outcomes. Similarly, the structure of the international economic system imposes constraints on the economic and security strategies available to states. This is not to claim that domestic interests and sectoral equities play no role in systemic outcomes. Clearly internal dynamics, distributions, and preferences can have international implications, as analysts have demonstrated.²³ Even so, certain structural conditions allow for a wider array of strategic choice and can thereby increase the “willingness” of certain states to “change

²¹ Gilpin, *War and Change in World Politics*, 85.

²² Gilpin, *War and Change in World Politics*, 85.

²³ Moravcsik, “Taking Preferences Seriously”; Putnam, “Diplomacy and Domestic Politics.”

the system.”²⁴ And although a number of mechanisms for change exist, conflict, as history has demonstrated, is one option for a state looking to avoid the takeover or elimination of its political and territorial market shares.

Along this microeconomic thread, structure also influences concepts related to firm movement. Again, just as the structure of an economic market sets constraints on the ability of firms to enter and maneuver within the market, so too does the structure of the international economic system restrict the movement of states within the broader geopolitical framework.²⁵ In this case, international economic structures that limit entry and exit, or reduce the abilities of states to execute political change, may generate stability. Stripped of a legitimate option to pursue change through the use of force in such structures, states may instead resort to exercising their political “voice” in outlets such as international institutions and organizations.²⁶

Of course what the correct structural conditions are for a durable peace is a constant theme of international political discussion. Theories in this tradition have focused largely on polarity, arguing that a range of multipolar, tripolar, bipolar, and even unipolar structures reduce the likelihood for change and thus interstate violence. Although the literature on structure in international politics has focused largely on the discrete number of great powers in the system as a measure of structural shape, this analysis focuses on *concentration*.²⁷ As a continuous measurement, concentration is appealing in both a quantitative sense and a theoretical sense. Interval discussions of polarity must draw the line from multipolar to bipolar to unipolar at some point.

²⁴ Gilpin, *War and Change in World Politics*, 85.

²⁵ For constraints on firm entry, see Stigler, “The Theory of Economic Regulation.”

²⁶ For a market discussion on “voice,” see Hirschman, *Exit, Voice, and Loyalty*.

²⁷ For discussions of polarity, see Schweller, “Tripolarity and the Second World War”; Waltz, *Theory of International Politics*; Wohlforth, “The Stability of a Unipolar World.”

Concentration can avoid this subjective process and yet still capture the degree to which the international system is accumulated in one, few, or many powers.

In his research on trade and war, Mansfield develops a measure of systemic power concentration and finds that the probability of conflict follows a curvilinear or inverse-U shape with concentration.²⁸ That is, the odds of conflict increase as concentration moves away from either low or high levels. Moreover, hegemonic stability theories associated with the lack of an international economic leader during the early twentieth-century, demonstrate the importance of highly concentrated systems for “international economic management.”²⁹ A fundamental conclusion within this school of thought is that “openness is likely to occur during periods when a hegemonic state is in its ascendancy.”³⁰ Given the conventional argument that open systems are peaceful, the following model combines these concepts to test the following structural hypothesis:

H1: *Higher levels of global economic concentration will decrease the likelihood of systemic conflict.*

Regarding *openness*, this analysis departs from measures centered on trade and binary constructs.³¹ Instead of focusing on raw levels of imports, exports, and GDP, it examines the tariff levels of the leading global economies to capture how open the system was in a given year. The following models use this alternative measure of openness to test the conventional economic interdependence-conflict hypothesis that:

²⁸ Mansfield, *Power, Trade, and War*.

²⁹ See, for example, Kindleberger, *Mania, Panics, and Crashes* and Kindleberger, *The World in Depression*. Eichengreen, "Hegemonic Stability Theory and Economic Analysis" 2-3.

³⁰ Krasner, "State Power and the Structure of International Trade" 323. Also, for an examination of the US as the international economic hegemon, see Lake, "International Economic Structures and American Foreign Economic Policy, 1887-1934."

³¹ Mansfield develops a binary systemic openness variable in his study. See, Mansfield, *Power, Trade, and War*. The intent here, however, is to move beyond a dichotomous construction.

H2: Increasing the level of global economic openness will reduce the probability of systemic conflict.

In sum, much of the existing interdependency literature has tackled questions of global economics and conflict by looking within the state and measuring bilateral trade levels. But as analysts we can gain insight into these questions by placing them within a structural framework and exploring alternative economic openness indicators. In the following section, therefore, I construct measures of structural openness and economic concentration using aggregate and hegemonic economic data. I then specify an autoregressive model and use event count regression methods to examine the systemic relationships among these key global economic explanatory variables and international conflict. The results suggest we rethink the conventional wisdom associated with economic globalization and peace.

III. Model Design

A. Dependent Variable

As mentioned above, the dependent variable here is interstate conflict from 1860-2000. Conflict measures come from the Correlates of War (COW) Project and represent both the discrete number of major wars and MIDs in a given year, to include both the *outbreak* and *occurrence* of systemic war and MIDs. Structural economic factors are likely to influence the probability of conflict erupting and the degree to which the system remains more or less violent. Consequently, the models capture both the number of initiated and ongoing conflicts in the system during a given year. In this sense, the analysis reveals not only how global economic conditions influence the outbreak of interstate hostilities but also how these conditions may affect the persistence of systemic conflict.

According to the COW Project, “To be classified as an inter-state war, at least two participants in sustained combat should qualify as members of the interstate system and there should be at least 1000 battle related fatalities among all of the system members involved. A state involved is regarded as a participant if it incurs a minimum of 100 fatalities *or* has 1000 armed personnel engaged in fighting.”³² MIDs, on the other hand, represent “conflicts in which one or more states threaten, display, or use force against one or more other states.”³³ Figures 2 and 3 display the discrete number of wars and MIDs during the period examined. As the graphs indicate, both variables demonstrate variation over this period, and in the case of MIDs, show signs of autocorrelation and the need for time-series autoregressive estimation techniques.

³² Sarkees, "The Correlates of War Data on War"; available at: <http://www.correlatesofwar.org/>.

³³ Ghosn et al., "The MID3 Data Set, 1993–2001"; available at: <http://www.correlatesofwar.org/>.

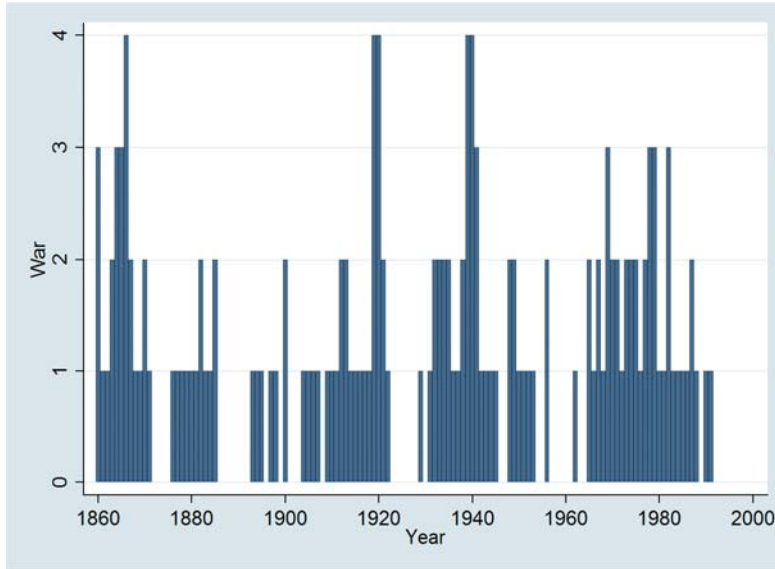


Figure 2. Wars in the International System (1860-2000)

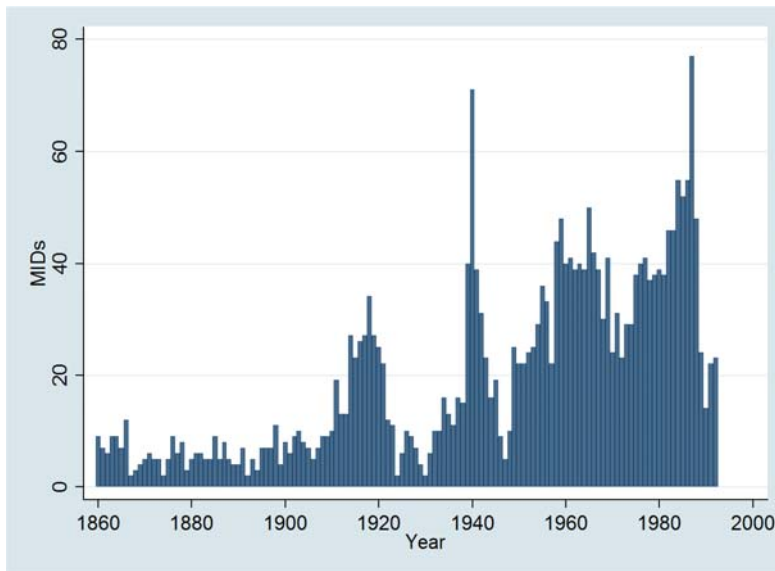


Figure 3. MIDs in the International System (1860-2000)

Just as debate surrounds the construction of interdependence indicators, the construction and coding of international conflict data has also become a contentious issue

among scholars. Part of this debate exists because quantitative approaches in this domain cordon off conflict into discrete time-frames and fail to capture those “almost” wars and interstate disputes. Moreover, they simplify complicated diplomatic crises into basic event count estimates of did or did not fight, thereby overlooking the moving causal mechanisms that led to either a negotiated settlement or ‘diplomacy by other means’. These constructions, scholars have noted, “were not intended to capture the full range of diplomatic behavior discussed by interdependence theorists,” particularly with regard to studies of “cooperation.”³⁴

But even at broader empirical and theoretical levels, these conflict variable constructions face hurdles associated with multicollinearity and endogeneity. War is at once both a dependent and an independent variable. It is difficult to imagine, for example, the global economy having no effect on the outbreak of international war, and just as difficult to imagine conflict, in particular the way in which that violence ends, having no effect on the resulting characteristics of the global market. Unfortunately this paper fails to overcome the endogeneity issues surrounding these systemic relationships. It does, however, take a quantitative swing at understanding how the openness and concentration of the economic structure influence levels of systemic conflict, while acknowledging the limitations of such an approach.

³⁴ Pevehouse, “Interdependence Theory and the Measurement of International Conflict,” 253.

B. Key Explanatory Variables

Openness

Openness here is the degree to which the leading economies have opened their domestic markets, as measured by tariff levels. Put differently, openness is the inverse of protection. The analysis uses two openness measures. One looks specifically at the tariff rate of the global economic hegemon (PROTECT_HEG); the other examines the average tariff rate of the top three global economic powers (PROTECT_TOP_3), as measured by GDP levels.³⁵ The first variable captures the potential influence of the global economic hegemon on the broader international market. If open hegemonic systems are in fact peaceful, the results should indicate lower counts of interstate violence. The second variable aggregates the systemic level of protection across the top three economies. According to H2 above, as protection among the top economies decreases, the likelihood of conflict should diminish. Figures 4 and 5 display the variation across these openness variables during the period examined. As the graphs indicate, differences between these two measures become apparent near the mid-twentieth century, when tariff rates of the economic hegemon – the United States – were relatively low compared to the average rate. These differences suggest potential disparities in the following quantitative estimates.

³⁵ Sources: Clemens and Williamson, "Why Did the Tariff-Growth Correlation Change After 1950?" and Maddison, *Contours of the World Economy 1-2030 AD*; data available at: www.ggdc.net/maddison/Historical_Statistics/horizontal-file_03-2007.xls.

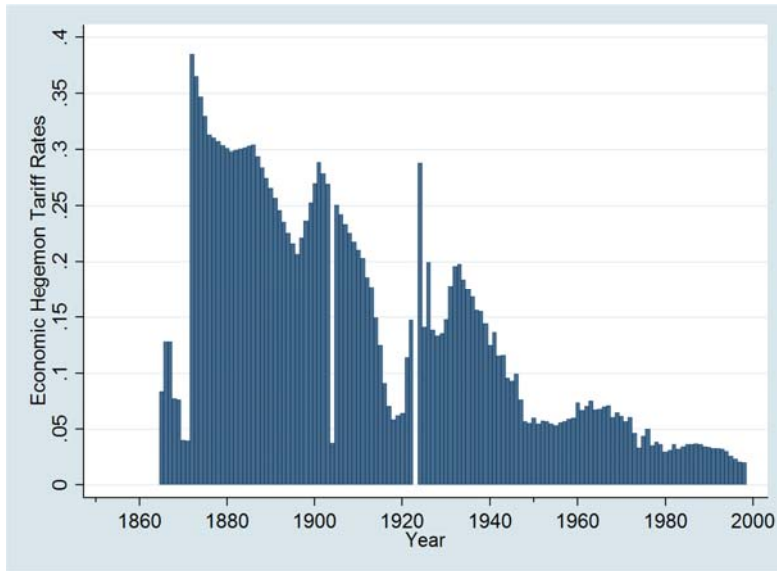


Figure 4. Economic Hegemon Tariff Rates (1865-2000)

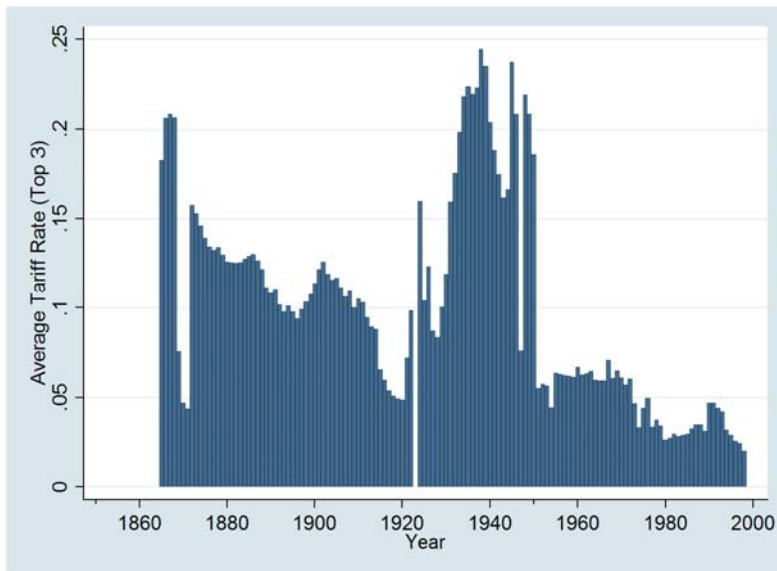


Figure 5. Average Tariff Rates of the Top Three Economies (1865-2000)

Concentration

Unlike openness, concentration is not unique to the global economic discussion. As mentioned above, it stems from the concept of power concentration and its effect on war. In this analysis, however, concentration is limited to the concentration of the global economy. The model below uses three variable constructs for global economic concentration. The first (E-CON_HEG_1) focuses on the degree to which the international economy is concentrated in a single global economic hegemon, as measured by the size of the economic hegemon over the sum of the top three global economies. The second (E-CON_HEG_2) again captures the degree to which the global economy is concentrated in the economic hegemon, but this time as measured by the economic hegemon over the total world economy. The third (E-CON_TOP 3) measures the degree to which the global economy is concentrated in the top three economies in the system, as measured by the sum of the top three economies over the total world economy.³⁶ The below model also includes a squared term for each of these measures to examine the potential curvilinear relationship between concentration and conflict. Figures 6, 7, and 8, display the variation across these measures of concentration during the period 1860-2000.

³⁶ For all three measures, Maddison's GDP data are used. Maddison, *Contours of the World Economy 1-2030 AD.*; data available at: www.ggdc.net/maddison/Historical_Statistics/horizontal-file_03-2007.xls.

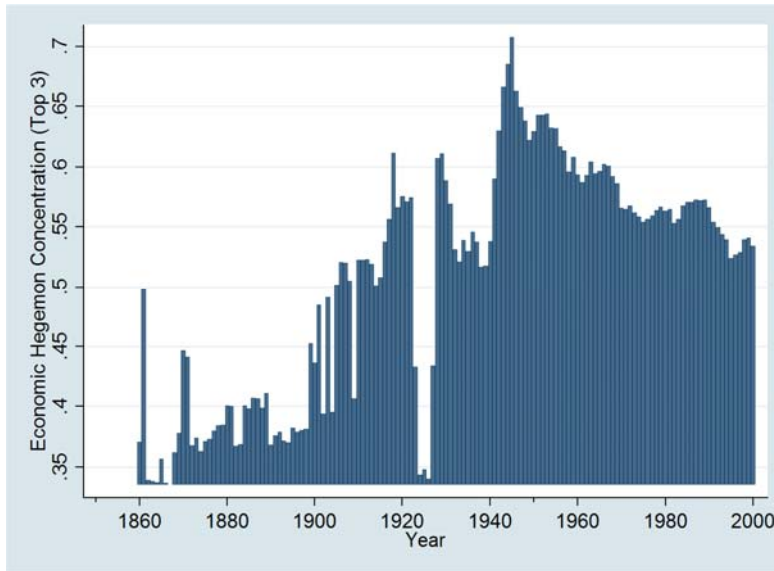


Figure 6. Economic Hegemon Concentration of Top Three Economies (1860-2000)

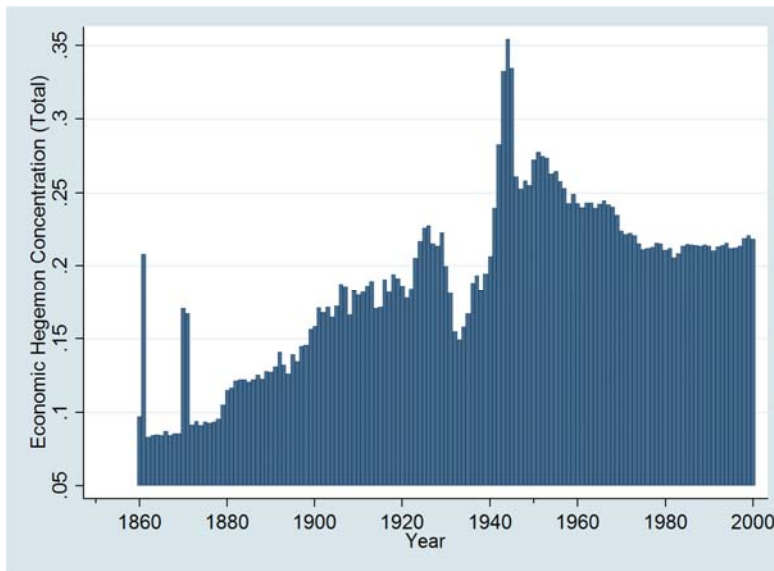


Figure 7. Economic Hegemon Concentration of Total World Economy (1860-2000)

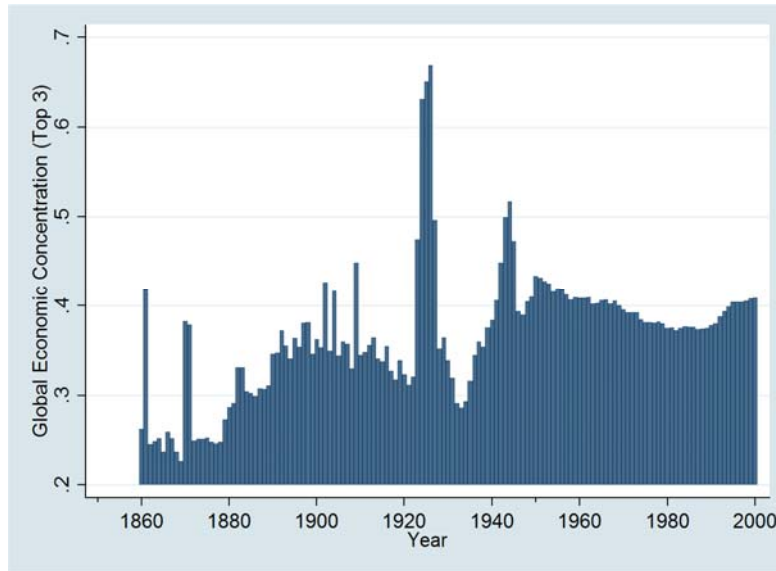


Figure 8. Global Economic Concentration of the Top Three Economies

As the graphs demonstrate, there are differences in levels of concentration across these three measures. Hegemonic concentration is fairly consistent between both variable constructs, but the global economic concentration of the top three economies is notably smaller than hegemonic concentration toward the latter half of the twentieth century. Likewise, the concentration of the top three economies peaks just after 1920, whereas the economic hegemon reaches its maximum toward the end of the Second World War. Table 1 lists the global economic hegemon for each year and highlights the influence the United States has had on the international economy over the past century.³⁷

³⁷ Clearly this table suggests the need for an understanding of United States foreign economic policy during the period examined. See for example, Frieden, “Sectoral Conflict and Foreign Economic Policy” for a domestic level perspective.

Table 1. Global Economic Hegemons (1860-2000)³⁸

<u>YEARS</u>	<u>GLOBAL ECONOMIC HEGEMON</u>
1860 – 1861	China
1862 – 1862	United States
1863 – 1864	Russia
1865 – 1865	United Kingdom
1866 – 1867	Russia
1868 – 1869	United Kingdom
1870 – 1871	China
1872 – 1903	United States
1904 – 1904	China
1905 – 1922	United States
1923 – 1926	Russia
1927 – 2000	United States

C. Additional Variables

Other systemic factors besides the shape of the global economy are likely to influence the probability of interstate violence. Studies have pointed to a number of variables, ranging from the amount of time since the last major war to the weather.³⁹ Two variables that have received significant attention within the field of international security are *democracy* and the *offense-defense balance*.

Democracy

Scholars in the democratic peace tradition have argued that democracy reduces the likelihood of conflict between and among states for both rationalist and constructivist

³⁸ Source: GDP estimates from Maddison, *Contours of the World Economy 1-2030 AD*; data available at: www.ggd.net/maddison/Historical_Statistics/horizontal-file_03-2007.xls.

³⁹ For these and other causes, see Blainey, *The Causes of War*.

reasons.⁴⁰ States have shared social norms and values and thus face difficulty pursuing violence against one another.⁴¹ Moreover, open democratic structures provide leaders the ability to send credible signals and release more information into bargaining processes, both of which increase the odds of reaching a pre-war negotiated settlement.⁴² Hence democracies, according to these analysts, not only cooperate more, but even when they fail to cooperate, they have the ability to reach settlements short of conflict. Given the level of attention democracy has received, the below model includes an aggregate structural measure of democracy (DEMOCRACY) from the Polity III Project and further derived by Gortzak, Haftel, and Sweeney. The variable ranges from -10 to 10. Lower numbers (-10 to 0) represent autocracies, whereas higher numbers (0 to 10) represent democracies, with 6 representing a “coherent” democracy. “To obtain the systemic variable,” Gortzak et al. “derive the number of coherent democracies by the number of all COW members in a given year.”⁴³

Offense-Defense Balance

Studies have also claimed that advantages for the offense or defense can influence the likelihood of conflict.⁴⁴ Technological advances in military machinery during certain eras have swung the offense-defense balance one way and the other. Scholars have suggested that swings toward an offensive balance in particular increase the probability

⁴⁰ For a starting point, see Doyle, “Liberalism and World Politics”; Rosato, “The Flawed Logic of Democratic Peace Theory”; and Russett and Oneal, *Triangulating Peace*.

⁴¹ Risse-Kappen, “Collective Identity in a Democratic Community.”

⁴² Schultz, *Democracy and Coercive Diplomacy*.

⁴³ Gortzak et al., “Offense-Defense Theory,” 22.

⁴⁴ Jervis, “Cooperation Under the Security Dilemma”; Van Evera, “The Cult of the Offensive and the Origins of the First World War”; Lieber, “Grasping the Technological Peace”; Van Evera, “Offense, Defense, and the Causes of War.” On the empirical end, see Gortzak et al., “Offense-Defense Theory.”

of interstate conflict.⁴⁵ Other analysts, however, have measured both the “perceived” and “actual” offense-defense balance and found minimal support for such claims. Either way, the balance is a prominent theme within the study of international conflict and is therefore included in the following model. Specifically, the analysis uses the “perceived” (O/D_BALANCE) continuous variable construction that Gortzak, Haftel, and Sweeney developed.⁴⁶ Values closer to 1 represent an offensive advantage, whereas those closer to 0 represent a defensive advantage.

According to much of the literature on a democratic peace and the offense-defense balance, therefore, the results of the following models should indicate that higher values of O/D_BALANCE increase the probability of systemic conflict, whereas higher levels of DEMOCRACY decrease the likelihood of such violence. Finally, the model also controls for the number of states in each year (#STATES), under the assumption that counts of international conflict are likely higher when there are more states in the system.⁴⁷

D. Methods, Model, and Hypotheses

There is a theoretically infinite number of WAR and MIDs counts in this study. Consequently, the analysis begins with Poisson regression. It then turns to negative binomial regression in the case of MIDs since the latent data generation process is not Independent and Identically Distributed (IID) Bernoulli and the Poisson assumption of “equidispersion” lacks plausibility. As a result, a key assumption in the model is that the

⁴⁵ Van Evera, “The Cult of the Offensive and the Origins of the First World War.”

⁴⁶ Gortzak et al., “Offense-Defense Theory,” 16. Note that the results are consistent when using the “actual” offense/defense balance estimates in place of the “perceived” estimates.

⁴⁷ Gortzak et al., “Offense-Defense Theory.” Note that results are similar, and in some cases even more significant, when this variable is dropped from the model.

parameter follows a random variable distribution, the gamma distribution. As preliminary results indicated, the variance function is not equal to zero and thus the gamma distribution fails to degenerate into a constant, thereby supporting the inclusion of negative binomial variance functions and estimates for MIDs.

Given the time-series nature of the data, autocorrelation is endemic. The literature on time-series/event-count regression analysis in this setting is advancing and offers a range of static and dynamic modeling approaches for handling the implications of time in both pure time-series and panel datasets.⁴⁸ This analysis uses a static autoregressive model that includes an endogenous lagged variable into the vector of regressors. According to scholars, “The most direct method to specify a time series model is to specify a standard count regression model, where analysis is conditional on past outcomes as well as current and past values of exogenous variables.”⁴⁹ I do so here for past outcomes ($t-1$) on the dependant variable, WAR and MIDs. The basic Poisson autoregressive model is:

$$E[Y_{iCONFLICT} | x] = \exp(\beta_0 + \beta_1 x_{i1} PROTECTION + \beta_2 x_{i2} ECON + \beta_3 x_{i3} ECON^2 + \beta_4 x_{i4} DEMOCRACY + \beta_5 x_{i5} ISO/D_BALANCE + \beta_6 x_{i6} STATES + \beta_7 x_{i7} LAG_CONFLICT)$$

Even so, such a model in which only the outcome variable is specified as an additional regressor is problematic, in large part because the model “is explosive for $\rho > 0$.”⁵⁰ More advanced modeling techniques include state-space, Hidden Markov, and other “dynamic” approaches (see Appendix). Nonetheless, I incorporate the

⁴⁸ See Brandt et al., “Dynamic Modeling for Persistent Event-Count Time Series” and Cameron et al., *Regression Analysis of Count Data*.

⁴⁹ Cameron et al., *Regression Analysis*, 238.

⁵⁰ Cameron et al., *Regression Analysis*, 238.; See also Brandt et al., “Dynamic Modeling,” 824-825.

autoregressive model into the analysis in an effort to take a first cut at addressing and handling such autocorrelation. Future approaches will wrestle with emerging dynamic event-count models, in particular the Poisson Exponentially Weighted Moving Average (PEWMA) model.

The model uses this autoregressive method to test two primary global economic hypotheses:

H1: *Higher levels of global economic concentration will decrease the likelihood of systemic conflict.*

H2: *Increasing the level of global economic openness will reduce the probability of systemic conflict.*

In addition, the conventional arguments on a democratic peace and the offense-defense balance are tested:

H3: *Increasing the level of democracy within the system will lower the likelihood of systemic conflict.*

H4: *Increasing the advantage of the offense will increase the probability of systemic conflict.*

E. Results and Discussion

Tables 1 through 4 below display Poisson and negative binomial regression estimates of global economic openness and concentration on both the outbreak and occurrence of international conflict.

Results

TABLE 1. Poisson regression estimates of global economic openness and concentration on the **outbreak** of international **WAR** (1865-1990).

Independent Variables	1	2	3	4	5	6
PROTECT_HEG	----- (2.073)	-3.155 2.051	-3.100	----- (2.031)	-3.042	-----
PROTECT_TOP_3	5.260 (3.134)	-----	-----	4.724 (3.284)	----- (3.297)	4.079
E-CON_HEG_1	-----	-----	-----	----- (22.420)	64.790** (21.800)	56.331**
E-CON_HEG_1_SQ	-----	-----	-----	----- (22.898)	-66.010** (22.124)	-55.896**
E-CON_HEG_2	-----	----- (21.397)	54.692** (20.906)	53.390**	-----	-----
E-CON_HEG_2_SQ	-----	----- (59.089)	-158.050** (57.078)	-144.916**	-----	-----
E-CON_TOP_3	72.727* (31.953)	75.010* (33.851)	-----	-----	-----	-----
E-CON_TOP_3_SQ	-103.572* (45.627)	-110.502* (49.224)	-----	-----	-----	-----
#STATES	.020 (.016)	.008 (.013)	.007 (.013)	.023 (.016)	.002 (.014)	.018 (.016)
DEMOCRACY	-.037 (.032)	-.048 (.034)	-.057 (.035)	-.056 (.035)	-.037 (.032)	-.037 (.032)
O/D_BALANCE	-.019 (1.143)	-.868 (.988)	-1.556 (1.083)	.023 (.016)	-1.018 (.983)	-.073 (1.231)
LAG_WAR	-.264 (.209)	-.226 (.197)	-.246 (.197)	-.287 (.211)	-.275 (.204)	-.314 (.216)
CONSTANT	-14.531** (5.429)	-11.882* (5.407)	-3.27 (1.936)	-6.23** 2.120	-14.461** (5.029)	-15.393** (4.834)
N	127	127	127	127	127	127

Note: Numbers in parentheses are standard errors. **Significant at .01; *Significant at .05

TABLE 2. Poisson regression estimates of global economic openness and concentration on the **occurrence** of international **WAR** (1865-1990).

Independent Variables	1	2	3	4	5	6
PROTECT_HEG	-----	-3.374* (1.450)	-3.325* (1.440)	-----	-----	-3.363* (1.470)
PROTECT_TOP_3	2.136 (1.977)	-----	-----	2.134 (2.010)	1.910 (2.010)	-----
E-CON_HEG_1	-----	-----	-----	-----	21.046 (12.600)	28.670* (13.346)
E-CON_HEG_1_SQ	-----	-----	-----	-----	-20.500 (12.793)	-29.401* (13.700)
E-CON_HEG_2	-----	-----	12.740 (10.155)	11.900 (9.745)	-----	-----
E-CON_HEG_2_SQ	-----	-----	-39.742 (27.460)	-32.547 (25.647)	-----	-----
E-CON_TOP_3	21.990 (14.544)	26.177 16.897	-----	-----	-----	-----
E-CON_TOP_3_SQ	-32.543 (20.645)	-40.652 24.605	-----	-----	-----	-----
#STATES	.010 (.009)	.006 (.009)	.006 (.008)	.012 (.009)	.011 (.010)	.003 (.009)
DEMOCRACY	-.022 (.019)	-.036 (.020)	-.035 (.021)	-.025 (.020)	-.026 (.020)	-.032 (.020)
O/D BALANCE	-.409 (.755)	-.737 (.678)	-.768 (.728)	-.315 (.810)	-.312 (.821)	-.838 (.708)
LAG_WAR	.335** (.080)	.279** (.083)	.296** (.082)	.350** (.080)	.339** (.081)	.291** (.082)
CONSTANT	-4.400 (2.520)	-3.32 (2.640)	-1.78 (1.031)	-1.938 (1.222)	-6.020 (2.806)	-5.782* (2.850)
N	127	127	127	127	127	127

Note: Numbers in parentheses are standard errors. **Significant at .01; *Significant at .05

TABLE 3. Negative binomial regression estimates of global economic openness and concentration on the **outbreak** of **MIDs** (1865-1990).

Independent Variables	1	2	3	4	5	6
PROTECT_HEG	----	-2.210** (.758)	-1.646* (.798)	----	----	-1.673* (.808)
PROTECT_TOP_3	.746 (.962)	----	----	.857 (.921)	.416 (.905)	----
E-CON_HEG_1	----	----	----	----	19.508** (5.956)	20.060** (5.808)
E-CON_HEG_1_SQ	----	----	----	----	-16.125** (5.878)	-17.447** (5.751)
E-CON_HEG_2	----	----	17.589** (5.019)	20.497** (4.994)	----	----
E-CON_HEG_2_SQ	----	----	-34.496** (11.640)	-38.797** (11.820)	----	----
E-CON_TOP_3	16.628** (4.244)	12.464** (4.349)	----	----	----	----
E-CON_TOP_3_SQ	-18.437** (5.016)	-13.967** (5.105)	----	----	----	----
#STATES	.003 (.005)	.003 (.004)	.007 (.004)	.010* (.004)	.008 (.005)	.006 (.004)
DEMOCRACY	.006 (.009)	-.008 (.008)	-.012 (.009)	-.009 (.004)	-.007 (.009)	-.009 (.008)
O/D BALANCE	-.176 (.317)	-.145 (.280)	-.054 (.294)	.045 (.323)	-.065 (.330)	-.152 (.294)
LAG_MIDs	.034** (.005)	.031** (.005)	.028** (.005)	.030** (.005)	.028** (.005)	.027** (.005)
CONSTANT	-1.949* (.935)	-.461 (.949)	-.091 (.638)	-1.093 (.632)	-4.116** (1.383)	-3.487** (1.372)
α	.127 (.027)	.113 (.025)	.102 (.024)	.109 (.025)	.102 (.023)	.095 (.022)
N	127	127	127	127	127	127

Note: Numbers in parentheses are standard errors. **Significant at .01; *Significant at .05

TABLE 4. Negative binomial regression estimates of global economic openness and concentration on the **occurrence** of **MIDs** (1865-1990).

Independent Variables	1	2	3	4	5	6
PROTECT_HEG	----	-2.58** (.672)	-2.222** (.694)	----	----	-2.218** (.691)
PROTECT_TOP_3	.805 (.888)	----	---- (.853)	.832 (.820)	.365	----
E-CON_HEG_1	----	----	----	---- (5.247)	17.973** (5.011)	18.949**
E-CON_HEG_1_SQ	----	----	----	---- (5.186)	-14.903** (4.970)	-16.780**
E-CON_HEG_2	----	----	13.974** (4.320)	17.083** (4.443)	----	----
E-CON_HEG_2_SQ	----	----	-28.120** (10.086)	-32.481** (10.558)	----	----
E-CON_TOP_3	13.494** (3.798)	9.442** (3.772)	----	----	----	----
E-CON_TOP_3_SQ	-15.168** (4.517)	-10.852** (4.464)	----	----	----	----
#STATES	.001 (.004)	.001 (.004)	.005 (.004)	.006 (.004)	.006 (.004)	.004 (.004)
DEMOCRACY	.006 (.008)	-.002 (.008)	-.012 (.008)	-.007 (.008)	-.007 (.008)	-.010 (.007)
O/D BALANCE	-.113 (.286)	-.085 (.244)	-.034 (.258)	.052 (.292)	-.035 (.292)	-.125 (.255)
LAG_MIDs	.034** (.004)	.029** (.004)	.027** (.003)	.030** (.004)	.027** (.004)	.025** (.003)
CONSTANT	-.979 (.828)	.572 (.814)	.805 (.540)	-.335 (.560)	-3.333** (1.219)	-2.652* (1.177)
α	.115 (.022)	.093 (.020)	.085 (.019)	.010 (.020)	.087 (.019)	.074 (.017)
N	127	127	127	127	127	127

Note: Numbers in parentheses are standard errors. **Significant at .01; *Significant at .05

The above results offer a number of insights regarding structure in the global economic-conflict discussion. First, openness suggests mixed findings in support of H2. When looking at the average tariff rate of the top economies, there is no clear significant relationship with openness and the level of conflict in the system. Yet when focusing on the economic hegemon, openness consistently and significantly increases the probability of systemic violence. That is, lower hegemonic tariff rates are associated with increased levels of interstate conflict, a finding that runs counter to much of the conventional wisdom associated with hegemonic stability and open, peaceful world markets. Even so, the estimates indicate that hegemonic protection has a greater influence on the occurrence, rather than the outbreak, of war. This finding suggests that although openness may increase the probability of ongoing systemic violence across time, there remains an untold story regarding the outbreak of major war. MID's estimates, on the other hand, indicate that openness positively and significantly increases the likelihood of both the outbreak and occurrence of systemic violence.

Second, the results support Mansfield's argument that conflict and concentration have an inverse U-shaped or curvilinear relationship. All three measures of concentration in the models suggest that as concentration moves away from either high or low levels, the probability of interstate violence increases. This finding is consistent with H1, power transition arguments, and power polarity theories that argue multipolar international systems are unstable.

Third, the results indicate that democracy and the offense-defense balance may play less of a role in interstate conflict than analysts have suggested. Democracy was consistently negative, but failed to reach standard levels of statistical significance. The

offense-defense balance likewise never reached standard significance thresholds. Moreover, the estimates consistently suggested that advantages for the offense were associated with peace, not war, as many studies have claimed. Consequently, the results fail to substantiate H3 and H4.

Combined, these global economic estimates are at first glance paradoxical. The conventional wisdom surrounding openness and concentration claims that highly concentrated systems are open, and open systems are peaceful. Hence the results should indicate that hegemonic openness is associated with peace, but this is not the case. Instead they suggest that high levels of protection and concentration will reduce the likelihood of interstate conflict. A high level of openness combined with a mid-level of global economic concentration, on the other hand, represents the most likely breeding ground for interstate violence.

Consequently, one observable implication from these results is that analysts should find conflict emerging during periods of increased economic openness and mid levels of concentration. The pre-World War I period in particular serves as a potential test case, as the continent of Europe was relatively open yet equally dispersed amongst a handful of competing powers.⁵¹ The examination of such cases may in turn flesh out the causal mechanisms within these results. Further, the estimates above highlight the broader modeling hurdles associated with specifying the systemic change Luigi da Porto once observed,

I have always heard it said that peace brings riches; riches bring pride; pride brings anger; anger brings war; war brings poverty; poverty brings humanity; humanity brings peace; peace, as I have said, brings riches, and so the world's affairs go round.⁵²

⁵¹ See Rowe, "The Tragedy of Liberalism."

⁵² Blainey, *Causes of War*, 87.

IV. Conclusion

This paper set out to further understand the relationship between the global economy and interstate conflict. Departing from previous studies that focused on bilateral dyadic trade flows and domestic levels of analysis, it examined the structure of the global economy and brought both tariff levels and the concept of global economic concentration into the discussion. It found that the relationships among these variables offer mixed results. In one sense, concentrated economic systems generate peace. Yet high levels of hegemonic openness increases the probability of systemic violence. This outcome suggests that we use caution when approaching popular claims that open world markets create international peace. Peaceful systems may not be open, and open systems may not be peaceful.

Indeed these results are at best a first cut. Even so, they provide a path toward future analysis in this domain. First, the model focused on structure, but clearly the economic capability and decisions of the US played a key role in outcomes during the period examined. As such, future research may seek to tap the domestic component of how powerful economies map the broader structural economy.⁵³ Second, additional work may tackle the foundational question of *why* does protection and concentration, under certain structural conditions, promote peace? Integrating theories of interstate bargaining and information would prove useful in such an enterprise. Protection may allow states the ability to increase their “capacity for violence” and hence send credible signals, and highly concentrated systems may be systems with symmetric information.⁵⁴

⁵³ See, for example, Frieden, “Sectoral Conflict and Foreign Economic Policy, 1914-1940.”

⁵⁴ See Fearon, “Rationalist Explanations for War”; Powell, “War as a Commitment Problem”; Wagner, *War and the State: The Theory of International Politics*.

Third, case studies would further flesh out the observable implications associated with the previous structural openness and concentration findings. Fourth, from a quantitative standpoint, incorporating interaction tests between concentration and openness would provide a more robust understanding of the relationship between these two explanatory variables.

Finally, along this empirical dimension, reversing the causal arrow between the global economy and conflict offers an entire range of future analytical exploration. It is difficult, if not impossible, to understand the global economic structure without understanding how conflict shapes that structure. Perhaps it is time we move conflict to the right-hand side of the equation.

Appendix – Handling Time

As discussed in the quantitative section above, the inclusion of an autoregressive dependent variable into the standard event count model is the easiest, and usually the first, route taken toward overcoming the problem of autocorrelation. This approach, however, has faced criticism.⁵⁵ As a result, scholars have proposed alternative approaches for handling autocorrelation in a time/event context. Below I list some of the prominent modeling options available for analysts wrestling with time-series/event-count data and regression techniques.

(1) Autoregressive Models

These models specify the conditional distribution of y and include lagged values of it. The model I used above illustrates this approach, but one can also specify a “multiplicative role” for the lagged dependent variable through transformations.⁵⁶

(2) Serially Correlated Error (or Marginal) Models

This approach also fully specifies the autocorrelation as a function of past values of the conditional mean, and so is similar to both the autoregressive approach above and to the techniques used to handle autocorrelation in linear regression models.

(3) Integer-Valued ARMA (INARMA) and Discrete (DARMA) Models

Unlike with the specification of the conditional distribution of y , INARMA is a fully parametric marginal approach similar to linear ARMA models except that it now specifies y as a count. DARMA, on the other hand, specifies the actual value of y as a mixture of processes.⁵⁷

⁵⁵ See Brandt et al., “Dynamic Modeling.”

⁵⁶ Cameron et al., *Regression Analysis*, 238.

⁵⁷ Cameron et al., *Regression Analysis*, 245-6.

(4) Hidden Markov or Regime Models

Again, unlike the general Markov or autoregressive model above, “hidden” approaches allow the parameters to vary across a number of unobserved regimes.⁵⁸

(5) State-Space / PEWMA Models

These models allow the parameters to vary across time and are hence classified as “dynamic” approaches to handling autocorrelation in “persistent” event-count time-series data. Of particular relevance and popularity in the study of political science is the Poisson exponentially weighted moving average (PEWMA) model.⁵⁹

⁵⁸ Cameron et al, *Regression Analysis*, 244.

⁵⁹ For a detailed discussion see Brandt et al., “Dynamic Modeling.”

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