THE ROLE OF ENERGY INTERDEPENDENCE IN SHAPING WORLD POLITICS

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Submitted to the Institute of Social Sciences
in partial fulfillment of
the requirements for the degree of
Doctor of Philosophy in Political Science

Sabancı University

June 2018

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DATE OF APPROVAL: June 25, 2018

ABSTRACT

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Ph.D. Dissertation, June 2018

Dissertation Supervisor: Assoc. Prof.
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Keywords: Energy, interdependence, dependence, dataset, international conflict, foreign policy affinity

Energy resources, unlike most other traded commodities, are essential for all economic and military activity. Given states' increasing needs to energy as a strategic commodity, understanding how energy interdependence affects international politics continues to remain relevant. While scholars have extensively debated the link between international politics and trade, systematic analyses gauging how energy interdependence shapes interstate relations are scant. To facilitate systematic research, this thesis introduces the Global Energy Interdependence Dataset. The dataset, presented in monadic and dyadic formats, covers the globe for the years between 1978–2014. Incorporating Militarized Interstate Disputes (MID) dataset and United Nations General Assembly (UNGA) voting data, I probe whether energy interdependence between states affects their foreign policy decisions or actions, and if so, in which directions—toward peace or conflict. Empirical results indicate that higher levels of energy interdependence, overall, promotes a cordial relationship within a dyad—reduces the likelihood of the onset and escalation. More importantly, higher levels of energy dependence curb importers' incentives to initiate MIDs against their suppliers. Higher levels of energy interdependence also increase foreign policy affinity within a dyad. Moreover, increasing energy dependence on the supplier causes foreign policy split-ups, or divergence, in a dependent state's relations with others in favor of the supplier. After disaggregating energy dependence based on four types of primary energy resources—coal, oil, natural gas, and electricity—only the natural gas appears as an effective commodity in mitigating conflictual relationship and promoting affinity where alternative ways of obtaining it (e.g. spot-market options) have been quite limited.

ÖZET

ENERJİ KARŞILIKLI BAĞIMLILIĞININ DEVLETLERARASI DIŞ POLİTİKAYI ŞEKİLLENDİRMEDEKİ ROLÜ

OSMAN ZEKİ GÖKÇE

Siyaset Bilimi

Doktora Tezi, Haziran 2018

Tez Danışman: Doç. Dr. Mehmet Emre Hatipoğlu

Anahtar Kelime: Enerji, karşılıklı bağımlılık, bağımlılık, veri seti, uluslararası anlaşmazlıklar, dış politika benzeşmesi

Küresel ticarette değer ve miktar olarak önemli bir yer tutan enerji kaynaklarının güvenli ve istikrarlı şekilde temini, ülkelerin ekonomik ve askeri faaliyetleri için stratejik önemdedir. Bu denli stratejik öneme sahip enerji kaynaklarının uluslararası politikaya olan etkisini anlamak, devletlerin artan enerji ihtiyaçları da düşünüldüğünde güncel bir gerekliliktir. Uzmanlar tarafından ortaya konan birçok araştırmaya rağmen, enerji karşılıklı bağımlılığının devletlerarası ilişkilere olan etkisi üzerine yapılan sistematik analizler oldukça sınırlıdır. Sistematik analizleri yaygınlaştırmak ve literatüre yenilikçi bir katkı sağlamayı amaçlayan bu tez, öncelikle Küresel Enerji Karşılıklı Bağımlılık Veri Seti'ni tanıtmaktadır. Bu veri seti yenilikçi bir ölçüm sistemiyle hesapladığı yıllık enerji bağımlılığı figürlerini tekli-, ikili- ve yönlendirilmiş-ikili-ülke formatlarında, 1978–2012 yılları arasını kapsayacak şekilde sunmaktadır. Bu tezde Devletlerarası Askeri Çatışmalar ve Birleşmiş Milletler Genel Kurulu Oylama veri setlerinden de yararlanarak, enerji bağımlılığının ikili-ülke dış politika karar ve eylemlerini ne yönde—barışçıl veya çatışmacı—etkilediği ekonometrik modeller kullanarak incelenmiştir. Ampirik sonuçlar iki ülke arasındaki enerji karşılıklı bağımlılık arttıkça çatışma veya ortaya çıkan çatışmaların tırmanma olasılıklarının azaldığını göstermiştir. Ayrıca, bir ülkenin enerji bağımlılığı arttıkça bağımlı olduğu ülkeye karşı çatışma başlatma olasılığı anlamlı şekilde azalmaktadır. Dış politikada benzeşmeyi bağımlı değişken olarak aldığımız modellerdeyse sonuç enerji karşılıklı bağımlılığının iki ülke arası benzeşmeyi artırdığıdır. Dahası, enerji ihracatçısı ülkeye olan bağımlılığın artmasının, ithalatçı ülkelerin diğer ülkelerle olan ilişkilerinde ayrışmalara yol açtığı gözlemlenmiştir. Enerji bağımlılığını dört temel kaynak bazında—kömür, petrol, doğal gaz ve elektrik—ayrıştırdığımızda, alternatif pazarlardan (örn. spot piyasa) yerine konulma şansı daha az olan doğal gazın devletlerarası çatışma olasılığını düşürmede ve dış politika benzeşmesini artırmada daha etkili olduğunu gözlemlemekteyiz.

To my selfless parents—Firdevs and Ömer Gökçe

ACKNOWLEDGEMENTS

First and foremost, I would like to express my sincere gratitude to my advisor Emre Hatipoğlu. In fact, he has not been just an advisor to me. He has been my mentor touching every aspect of my life, other than academic. Sometimes he became my elder brother, sometimes he endured my waywardness like a father, and sometimes he makes me feel that I am his close friend. He rigorously taught me how to become a good researcher and academic, and how to learn from my mistakes. Emre Hatipoğlu will always remain as my "Emre Hocam" and my lifelong mentor. To write academically, I am gratefully indebted to him for his continuous support throughout my M.A. and Ph.D. studies and other research, for his patience, motivation, and seminal thoughts. I could not have imagined having a better advisor and mentor for my professional life.

I would also like to thank other committee members Meltem Müftüler-Baç, Abdurrahman Bekir Aydemir, Mitat Çelikpala, and Ömer Faruk Örsün, who were very accommodating and whose questions and insightful remarks taught me a lot.

My closest friends deserve special mention here. Throughout my Ph.D. years with ebbs and tides, Ayşe Büşra, Gülnur, Yeşim, Elif, Yasemin, Ilgım, and Faruk have helped me with their sincere friendship, support, and motivation, as well as valuable academic endowment. I will never forget the enjoyable times that we spent together.

Above all, I wish to record my most sincere gratitude to my family who has given their support during my Ph.D. study. First, among them are my lovely wife Zeynep, and beloved children, Ömer Selim, Emir Mehmet, and Firdevs Hümeyra. I appreciate my wife many sacrifices in more ways than I will ever be fully able to express. Without her help, support, and sincere love, I could not have successfully completed my Ph.D. on time. I also owe much to my parents, Ömer and Firdevs, and my brother, Mahmut Hilmi, who deserve special thanks for their altruistic behavior during my whole life. I also thank Mehmet Sıddık Akşit for his support and generosity, and Mustafa Cevat Akşit for his encouragement of being an academic and prayers when I really need.

Finally, I am grateful to Sabancı University and TÜBİTAK-BİDEB for assisting me financially during my Ph.D. study.

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CHAPTER 1

1.1.Introduction

Does economic interdependence between two states lead to cordial relations or conflict? This question has fueled one of the most popular debates in the literature. This debate passed on from ancient Greece and Rome to medieval scholastic thinkers, who, in turn, shaped the ideas of the post-Renaissance mercantilist Europe several hundred years later (Keshk, Pollins, & Reuveny, 2004). This interest has not been confined to Western civilizations. One of the earliest arguments on the subject came from Chinese political philosophers who advised balancing security threats against gains from trade with nomadic tribes (Jagchid & van Symons, 1989).

The concept of economic interdependence was re-introduced in modern international relations (IR) literature by Immanuel Kant's Perpetual Peace. This topic resurfaced after the Cold War, with the advent of the democratic peace theory (Oneal & Russett, 1997). Liberal democratic peace theorists speculated that "dividends from peace" enlarge and strengthen the dovish camp in trading countries, hence, leading to more cordial relations between trading states. The realists, in turn, have countered this claim by asserting that trade tends to follow the flag and interdependence makes states vulnerable to volatilities in critical supplies (Barbieri, 2002). Eventually, the debate has evolved beyond the liberal-realist debate as the focus shifted on the nature of specific goods traded (Dorussen, 2006), and on economic ties besides trade such as foreign direct investment (Rosecrance & Thompson, 2003).

The notion of economic interdependence, however, relates to concepts beyond economic and financial relations. Energy interdependence between countries constitutes one of these concepts, which has gained notable importance over the last couple of decades for policy-makers. For example, in the final presidential debate for the 2016 U.S. elections, Hillary Clinton spent almost as much time talking about interstate energy relations as she did

for interstate commodity trade. The reason for spending such significant time on interstate energy relations is that energy is a source of almost all human activity. It is not only critical for the military activity (e.g. warfare or logistical support) but also an unsubstitutable input for the economy. In fact, the global markets for oil and natural gas account for more than half of the commodity trade in the world today (Hendrix, 2015), which makes energy is the most valuable traded commodity. With such strategic importance and high value, energy has influenced inter- and intra-state conflict dynamics (Månsson, 2015; Ross, 2004) by directly affecting states' ability to wage and maintain war (Colgan, 2013). Moreover, energy resources also tend to provoke conflict since such goods are appropriable (Dorussen, 2006). In 1942, for instance, Germany targeted Baku with Operation "Blue" and split up its army between Moscow and Baku to reach oil and continue the war.

Since energy resources are, in general, not fungible, not easily diversifiable, and based on natural endowments, securing them has always been of interest for states. In other words, energy security is a national interest (Yergin, 1988). Since the lack of energy resources would cause detrimental effects on military security and prosperity, increasing dependence on energy and energy supplier would cause vulnerability for naturally non-endowed or non-energy-sufficient countries (Keohane & Nye, 1977). As a result, energy can be used as a weapon for achieving the political purposes of the supplier states, either as a complement to or substitute for military power. For instance, days after Britain announced it was sending 75 troops to Ukraine on a training mission President Putin demanded immediate advance payments to keep the gas taps on. Putin's ultimatum came on the day that the EU announced ambitious plans for an "energy union" to end Russia's energy stronghold over the continent. Putin said that Ukraine had paid only enough cash,

> "for three or four days' gas supplies. Unless there is a prepayment, Gazprom [the Kremlin's energy giant] […] will terminate the supply. Of course, this may create a threat to transit to Europe, to our European partners […] Imagine these people will be left without gas in winter. Not only that there is famine […] It smells of genocide" (Relph, 2015).

This anecdotal evidence suggests that vulnerability is expected to make importer states more tamed against their suppliers (Harsem & Claes, 2013), and in fact, it may work. In August 2008, Erdoğan, at the time of Georgia-Russia conflict, stated his opinions on the political position of Turkey between Russia and the United State (the U.S.):

> "Turkey is being forced to choose his side between the U.S. and Russia. While the U.S. is our closest ally, Russia is one of our important trade partners, specifically on energy. I never let Turkey to be pulled wholly into one side. We act in accordance with what Turkey's national interests necessitate. Russia is an important energy supplier for us. [...] Turkey's need for energy, specifically to natural gas, is obvious. Can we ignore all these facts? When you consider our economic cooperation with Russia, you cannot disregard Russia. Then, Turkey will look for a balance toward its interests" (Bila, 2008).

Such a response from importer states is quite normal because disruption in energy trade would produce much more devastating impacts for an importer country (Cameron, 2007; Shaffer, 2009; Lee, 2017). Figure 1 shows inflation and unemployment trends in the U.S. for the period of 1960–2014. When we connected the points corresponding to each year within

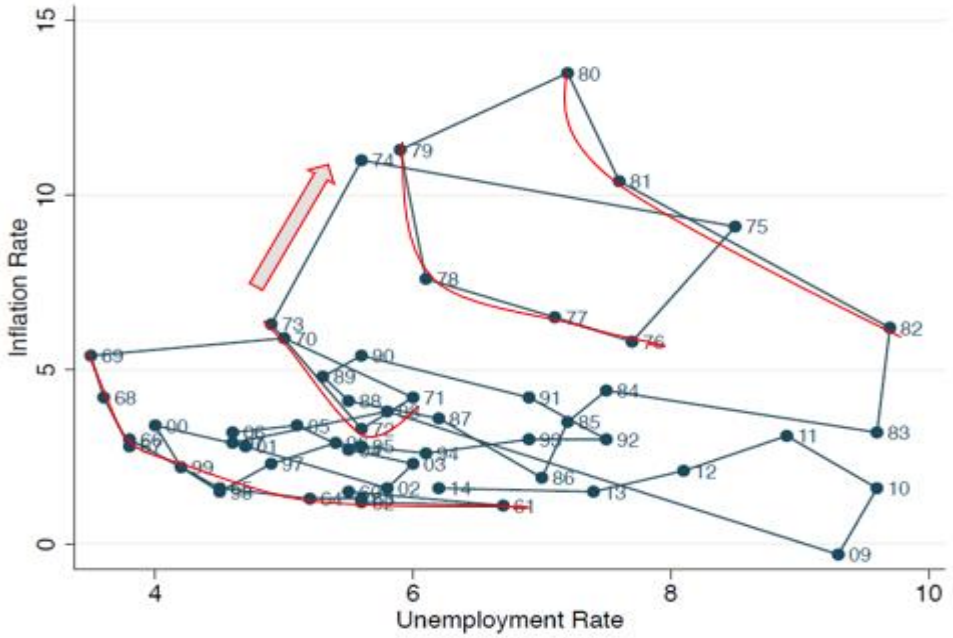

Figure 1: The Philips Curve in the U.S., 1960-2014 (Source: Federal Reserve Economic Data)

that period, we can see the Philips Curve apparently. The Philips Curve simply shows the inverse relationship between inflation and unemployment rate, both of which are detrimental for the economy. That the Philips Curve shifts to the right mean the economy is going bad. At Figure 1, lines colored with red show the Philips Curve for in the U.S. just before (1960s), during (1970s), and after (1980s) infamous Organization of the Petroleum Exporting Countries (OPEC) oil embargo. To remember, six days after the Yom Kippur War begins, US airlifts weapons and supplies to Israel in Operation Nickel Grass. OPEC recognized an

opportunity; implemented an embargo in response to the U.S. support for Israel. World oil market tightened from 1970 to 1973—U.S. oil reached maximum production and embargo caused the price of oil to rise from $3/bbl to $12/bbl. The direction of the red curves to the right clearly indicates that the U.S. economy had been struck heavily by the OPEC embargo. Compared to figures in the 1960s, both inflation and unemployment rates go worse and the devastating effects shadow forth in early 1980s. This anecdotal evidence simply exemplifies why disruption in energy trade would produce much more devastating impacts for an importer country.

Similar detrimental effects were also observed in other developed countries. As Yergin (1991) reveals, disruptions in energy trade appear as an effective tool to split alliances and encourage concessions. The following quotations show the responses of statesmen from three developed countries at the time of the embargo (quotations are obtained from Yergin (1991)):

> "While our interests in many respects are parallel to the interests of Israel, they are not synonymous with the state of Israel. The interests of the U.S. go beyond any one nation in the area. […] There is an increasing concern in our country, for example, over the energy question, and I think it is foolhardy to believe that this is not a factor in the situation" (Joseph Sisco, Assistant Secretary of State, United States)
>
> "It is inevitable that Japan will competitively follow her own independent direction. The era of blindly following has come to an end. […] Resource diplomacy [means] standing on the side of the oil producing countries" (Yasuhiro Nakasone, Minister of International Trade & Industry, Japan)
>
> "You [the United States] only rely on the Arabs for about a tenth of your consumption. We are entirely dependent on them" (Georges Pompidou, President of France)

Given states' utmost interest in energy resources understanding when and how energy interdependence affects international politics continue to remain relevant. Despite this surging interest, most valuable studies remain as in-depth case studies, describing sophisticated process shaping events in a particular case. Systematic studies that look at how energy shapes interstate politics generally, and how energy interdependence affects dyadic state relations specifically, are scarce.

Aiming to facilitate and conduct systematic analyses of questions related to energy interdependence and international politics, this thesis rests on two main pillars: (1) the development of a novel energy interdependence index measure: the resulting cross-sectional time-series dataset will be the first of its kind with respect to its spatiotemporal domain, and (2) the systematic analysis of the relationship between energy interdependence interstate relations using statistical large-N estimation techniques.

1.2.Energy Interdependence and Interstate Conflict

The study of international conflict represents the touchstone of the field of international relations. The question of when interstate conflicts lead to the use of militarized force or even cause war is a central question within this topic (Bennett & Stam III, 2004). Research on correlates of such interstate conflict has immensely benefited from inquiring into dyadic qualities of potentially conflicting states. Whether or not both states are democratic (Maoz & Russett, 1993; Russett & Oneal, 2001), the extent and the nature of trade ties between the two states (Gelpi & Grieco, 2008; Polachek, 1980); similarity of cultural and domestic political institutions within the dyad (Huntington, 1996; Henderson & Tucker, 2001), frequency of joint membership in international organizations (Oneal, Russett, & Berbaum, 2003), as well as the institutional quality of these organizations (Bearce & Omori, 2005) are among many dyadic factors that have been systematically studied and shown to affect the probability of interstate crisis onset and the propensity of these crises to escalate to the use of militarized force.

This thesis aims to add the topic of energy interdependence to this established line of literature on the dyadic factors shaping interstate conflict. In general, it aims to test the liberal hypothesis that higher levels of energy interdependence will pacify both parties and make them less likely to resort to force. In doing so, this thesis focuses on the aspect of vulnerability in interdependent relationships and builds further arguments upon this aspect.

The investigations in this study also aim to test more nuanced hypotheses on militarized conflict onset and escalation. Energy interdependence may prevent the onset of conflicts, and moreover, once a crisis erupts, high levels of energy interdependence may also be an inhibitor for the escalation of the conflict. Existing research indicates a number of factors that decrease both the probability of conflict onset and escalation (e.g. Reed, 2000,

Braithwaite & Lemke, 2011). Energy interdependence may be one of these factors; higher levels of energy interdependence between two countries may dampen the probability of the conflict onset, as well as escalation.

1.3.Energy Interdependence and Foreign Policy Affinity

Energy interdependence may shape interstate relations beyond international conflict—energy interdependence may lead to convergence in the decisions of states in foreign policies. Neoliberal-functionalist theory underpins this line of thinking. A group of states may institutionalize their trading relations through various economic agreements (e.g. customs unions, long-term preferential purchasing agreements, joint infrastructure investment projects). Such institutionalized groups reduce opportunistic behavior and optimize resource allocation within participating countries, hence increasing gains from the economic interaction among states (Abbott & Snidal, 2000). Sustaining these gains is a major motivation for states to cooperate with each other, as a result, these "preferential groupings establish a forum for bargaining and negotiation that dampens interstate tensions, promotes reciprocity, and facilitates the resolution of conflicts before they escalate" (Mansfield & Pevehouse, 2003, pp. 776).

Energy trade often requires long-term investments (e.g. long-term procurement contracts, long-term operation schemes as nuclear plant operation contracts evince, large-scale gas and oil transport projects), which may encourage states towards longer-term cooperation. This cooperative stance, in turn, may lead to a convergence in foreign policy preferences.

Alternatively, the vulnerability against potential disruption in energy flows may also shape states' decision in a way to not bother the supplier and bend to its wishes. This study discusses all these possible explanations in the light of energy politics and interdependence theory in IR.

A visible international platform upon which this convergence of interests may reflect is United Nations General Assembly (UNGA) voting patterns. While a number of studies look at what makes states vote along similar lines in the UNGA (e.g. Holloway, 1990; Wang,

1999; Dreher & Sturm, 2012), the role of energy interdependence on UNGA voting similarity has not been examined yet.

1.4.Outline

The following chapter gives an extensive review of the literature on interdependence theory in IR. This chapter is important to set the stage for energy interdependence, the phenomenon that I want to ground onto the theory of interdependence. Beginning with the discussion on the definition of interdependence, this extensive review grounds arguments about the relationship between interdependence and interstate relations onto theoretical foundations, specifically theories on the relationship between trade and conflict. Theories, explanations, and the following empirical work seem to be divided into three main camps: (1) the liberals, who defend unconditionally negative association between trade interdependence and conflict, (2) the realists, who argue that extensive trade ties increase interstate conflict, and (3) the others, who argue that the impact of economic interdependence is contingent upon the nature of dependence between states. I extensively discuss both theoretical and empirical studies investigating the interdependence–interstate relations nexus. In chapter 3, I emphasize the importance of energy as a strategic commodity traded and the necessity of marking out such a strategic commodity while analyzing the impact of interdependence on interstate relations. The main discussion in this chapter is that the need for energy and its trade perfectly fits into the arguments related to the vulnerability aspect of interdependence. States importing energy resources are supposed to be in a more vulnerable situation compared to their supplier, and thus, such a relatively vulnerable position are expected to the influence importers actions and behaviors against their suppliers. Moreover, extensive energy relations within pairs of states should increase the potential cost of conflict whereby energy flows may incur the risk of disruption. At the end of this chapter, referring to arguments made by energy politics scholars and theoretical foundations set by IR scholars, I derive a set of testable hypotheses. In chapter 4, being cognizant of technical problems in previous measurements in interdependence, I discuss a strategy to measure energy dependence which is expected to capture variations in two main aspects of interdependence—sensitivity and vulnerability. In the light of previous empirical studies providing different approaches in operationalizing interdependence, as well as the studies pondering about quantification of energy security

measures, I offer a reliable measure of energy dependence and produce an energy interdependence measure out of it. Chapter 5 aims to explain the procedures in the calculation of energy dependence. Specifying necessary information to quantify energy dependence, reviewing the databases that disseminate this necessary information, remarking compatibility problems observed across these databases, and finally explicating the steps toward synchronization of different data sources, this chapter provides a codebook for our new variable—dyadic energy interdependence variable. Chapter 6 investigates the relationship between energy interdependence and interstate relations and tests the hypotheses derived in Chapter 3 by employing quantitative large-N estimation techniques. This chapter mainly examines whether (i) energy dependence affects the behaviors of importer countries against their suppliers, (ii) energy interdependence promotes peaceful relations within dyads, and (iii) energy interdependence increases foreign policy affinity between states. This chapter also offers systematic investigations for some of the claims made in energy studies lacks are also tested by employing energy interdependence variables. In the final chapter, I summarize the findings and discuss their policy-wise implications. I also note the relevance of the findings for current debates in energy politics and outline an agenda for future research.

CHAPTER 2

2.1.Introduction: Theoretical Framework and Literature Review

The nature of the relationship between economic interdependence and interstate relations has been the subject of one of the most popular topics in international relations literature. Liberals claim that more trade is associated with peaceful relations, whereas realists think trade-relations deteriorate interstate relations. As arguably the most valuable traded commodity in the world, energy constitutes more than half of the commodity trade in the world today. Unlike most other traded commodities, securing energy resources is essential for all economic and military activity, which increases the strategic importance of these resources. States vary significantly in their energy resources and a country's energy endowment can have a big impact on its destiny. Its abundance was critical to the rise of some global powers (e.g. U.K.) while its scarcity has led others to start wars and disappear (e.g. Imperial Japan). Given states' intense competition over energy resources, understanding when and how energy interdependence affects international politics continue to remain relevant. However, none of the approaches in international relations has yet to investigate the specific role of energy dependence between countries. This is an important gap, as the arrival of new technologies such as fracking and renewable technologies constantly disrupt global energy trade. In a global platform where energy relations between states remain in constant flux, scholars and policy-makers need a better theoretical and empirical understanding of energy dependence in international politics to guide us in the future.

This thesis aims to contribute to the literature by examining how energy dependence shapes interstate relations. Grounding the arguments and specifying my contributions, in the first place, requires the extensive review of the trade and interdependence in international relations literature, which I will do in the following section. In doing so, this section starts from the notions of early thinkers on trade and interstate relations and sets the stage for interdependence in world politics, which, in fact, started to be used later as a concept. Not

only does the following section unfold the extensive debate on interdependence, but also it relates energy dependence to the literature innovatively—it prepares the background upon which I present energy as a sui generis type of interdependence and discuss the specific processes whereby energy interdependence shapes interstate relations. Before I start the debate on trade and interstate relations put forward by different schools of thought, I will clarify the terminology relating to interstate trade—interdependence, dependence, and interconnectedness. The reason for why I choose such an arrangement is that trading relationship between states has usually been identified by using these terms. Distinguishing which term corresponds to what kind of relationship would be a better way to grasp what the literature has explained or failed to explain, so far.

2.2.Interdependence: A Conceptual Clarification

Interdependence is inherently an overarching concept that comprises more than the level of trading relationship (McMillan, 1997). In the international relations literature, scholars have generally used interdependence and mutual dependence interchangeably to refer to the extensive interstate trading relationship (see Hirschman, 1945; Keohane & Nye, 1977; Nye, 2009). Dependence, however, stands for a unidirectional relation of either side vis-à-vis its partner. These terms may also be applied to describe numerous relationships in different levels of analyses of international politics: individuals, states, and systems. Therefore, trade ties between states will surely influence forms of relationships other than economic.

The term interdependence is used to describe mutually dependent interstate relationships given existing bonds: neither relative independence—being interdependent completely differs from being independent—nor one-sided dependence. As Keohane and Nye indicate:

> "In common parlance, dependence means a state of being determined or significantly affected by external forces. Interdependence, most simply declined, means mutual dependence. Interdependence in world politics refers to situations characterized by reciprocal effects among countries or among actors in different countries […] Where there are reciprocal (although not necessarily symmetrical) costly effects of transactions, there is interdependence. Where interactions do not have significant costly effects, there is simply interconnectedness" (1977, pp. 8–9).

Keohane and Nye (1977) make two distinctions here: (i) dependence vs. interdependence and (ii) interdependence vs. interconnectedness.[1] Even though some scholars simply require the existence of interstate trade linkages to assure mutual dependence (see Hirschman, 1945, pp. 10–11), others make distinctions between interconnectedness (*a la* Keohane & Nye) and interdependence. To be transformed from interconnected to the interdependent relationship, the ties between states should be extensive and salient. Moreover, only when the mutual need exists, the dependent relationship turns into an interdependent one. Based on Gasiorowski's (1986) interpretation," interdependence refers here to a particular kind of international relationship that emerges when countries are linked by interactions that can be both costly (i.e. unregulated trade, serious dependencies embrittling country against embargoes and blockades, dependence and vulnerability) and beneficial (i.e. lower price, income, or efficiency)" (Gasiorowski, 1986a, pp. 24).

While interconnectedness is conceptualized around transactional flows between states, interdependence entails a vulnerability and sensitivity. While "sensitivity involves degrees of responsiveness within a policy framework—how quickly do changes in one country bring costly changes in another, and how great are the costly effects?"—(Keohane & Nye, 1977, pp. 32), vulnerability determines costs as a function of both changes and the availability of alternatives—"Vulnerability can be defined as an actor's liability to suffer costs imposed by external events even after policies have been altered" (Keohane & Nye, 1977, pp. 33). For instance, suppose two countries need the same proportion of natural gas import to fulfill their domestic demand. If one of these two states could diversify its natural gas needs by easily altering supplier or shifting to domestic production in a less costly way, and if the other state has no option but the usual supplier in order to fulfill domestic gas demand, then the latter would be more vulnerable than the former, although they both seem equally sensitive to price changes.

This study focuses on a specific type of dependence or interdependence, namely energy interdependence. In accordance with my focus here, I cover previously studied dependence types in this literature review as well as their theoretical backdrop. Focusing on types of

[1] Keohane and Nye also talk about another type of an interdependence—complex interdependence. "Complex interdependence is a situation in which the interests and policies of a group of countries become closely interrelated because of strong, mutual ties in a number of issue areas" (Keohane and Nye, 1977, pp. 24–29).

dependence, however, may require some theoretical and empirical explanations regarding differences across relationship types. Moreover, such relationships are not mutually exclusive and are better examined in terms of degree, in addition to kind because interdependent actors may demonstrate both conflictual and cooperative interactions in a continuum. The level of interdependence between them may change over time (De Vries, 1990). As should be clear, to fully grasp the effect of interdependence on interstate relations we should make comparisons across observations with respect to kind (i.e. qualitative differences) and degree (i.e. quantitative differences) (King, Keohane, & Verba, 1994).

Putting aside the discussion of how to analyze interdependence and its impact, in the following subsection I want to start with extensive theoretical and empirical debate regarding interdependence–conflict nexus. In addition to being knowledgeable about the extent to which and what

2.3.Interdependence and Interstate Relations

Interdependence, in a form of trading relationship, has long been debated by international relations scholars regarding its impact on interstate relations: whether increasing levels of trade leads to cordial or conflictual relations between states (Angell, 1910; Cobden, 1878; Hirschman, 1945; Mill, 1848; Montesquieu, [1749] 1989; Paine, 1791; Smith, [1776] 1937; Spiegel, 1991; Viner, 1937). Three approaches in international relations —liberalism, realism, and Marxism— help us explain the relationship between trade and conflict based on a variety of assumptions that they have in themselves. Each of these approaches has worthwhile contributions to our understanding of how trade affects interstates relations and ignoring any one of these might render us deficient in terms of explaining trade-conflict nexus. For sure, these approaches inherently have main differences; even within each approach, we observe irreconcilable inconsistencies. Therefore, instead of concentrating only on differences, I prefer discussing emergent propositions across different schools of thought as well as implications related to interdependence, particularly in energy.

Different schools of thought in international relations base their arguments on the assumptions they put forward about the identification of the primary actors: Who is the primary actor in world politics? Realists build up their arguments on the assumption that the state is the primary actor in international relations; liberals center on the individual and the

states; the Marxists treat economic classes as the main actors. Explanations on the trade-conflict nexus, therefore, have been framed in regard to presumed levels of analysis (i.e., individuals, classes, states, and systems). More importantly, we observe discrepant results across studies even using the same levels of analysis. For instance, while Rosecrance (1986) and Mansfield (1994), in their system-level analyses, find that the increase in trade mitigates the severity of conflict between states, Waltz (1979) argues that diminishing interdependence during the Cold-war period is one of the factors conducive to peace in this period, again using system-level analyses. Although system-level analyses help us understand the impacts of systemic (i.e. global) interdependence, focusing just on systemic variables leads us to miss the dynamics of interstates relations with respect to varying degrees of interdependence and dyadic characteristics. Since we observe militarized disputes, and even wars, between states in an interdependence world, scholars divert their focus from system-level analyses to dyadic ones and formulate their questions accordingly: state more likely to engage in conflict with important trade partners or against other countries having no trading relationship with them? (Barbieri, 2002). Again, in dyadic investigations, we observe discrepant empirical results. While many of them find offer evidence for the hypothesis that trade promotes peace within any dyads (Gasiorowski, 1986a; Gasiorowski & Polachek, 1982; Polachek, 1980; Polachek & McDonald, 1992; Polachek, Robst, & Chang, 1999; Sayrs, 1989) or politically relevant dyads (Oneal, Oneal, Maoz, & Russett, 1996; Oneal & Ray, 1997; Oneal & Russett, 1997), some other studies show the reversal (Barbieri, 1996; Wallensteen, 1973).

Scholars, therefore, should be aware of the fact that the impact of the variable of interests, trade, may change across different levels of analysis, so may our overall understanding. Without this distinction on levels of analysis, scholarly explanations may mislead us (Singer, 1961). In methodological terminology, scholars might be trapped into ecological or individualist fallacies in their interpretations. Liberals, for instance, make claims about the benefits of trade for people and expand these claims for the states or nation as a whole. Being cognizant of other approaches and levels of analysis, I focus on the impact of trade on relations between dyads. This clarification is required because vague identifications of the primary actors in scholarly discussions of international relations may culminate in significantly different conclusions.

Another contentious issue among different approaches is the assumption about the national interest, the poor identification of which, again, might change theoretical implications as well as conclusions. According to liberals, the national interest is driven by a desire to maximize social welfare. If it is done so, then that trade promotes peace, and thus, national welfare is conceivable. Identification of realists, however, revolves around states' motivation in power maximization and survival. For a typical realist, states should maintain trade relations with their partners so long as these relations serve to their national security, which could also be the case for a liberal perspective. When survival is at stake, then these so-called temporary arrangements could break up by using force, even against a trade partner. If the trading partner is vital for the state, however, the use of force may not be an attractive option. However, realists also argue that trade may lead to conflict, that is, trade can lead to issues over which states wage conflict. For instance, a state may want to take over the other state because of its resources. Or trade creates a new industry where one party possesses the only rare minerals for that industry to function. Then, the country without the minerals may find it in its interest to capture these minefields. Marxists are also cognizant of states' desire to maximize wealth, like liberals, but they are suspicious of whether this wealth is gained to benefit society regardless of the interests of a particular class. So long as outcomes of trade do not benefit the society as a whole, but the dominant classes, the conflict would be an inevitable result, according to (Marx, 1887). The Marxist approach has also reservations about the distribution of costs and benefits within an interdependent relationship: they reject the liberal assumption that trade is beneficial in any case and suggest that trade and interdependence are only beneficial for the advantageous side which may exert political and economic manipulations out of a trading relationship over the disadvantaged.

2.4.Three Hypotheses

Based on three mainstream theoretical approaches, we can come up with three hypotheses about the trade–conflict relationship, with respect to the null—no relationship exists between trade and conflict: (i) interdependence promotes peace (unconditional liberal hypothesis), (ii) some (i.e. symmetrical) economic ties could promote peace whereas some others (i.e. asymmetrical) induce conflict, and (iii) interdependence increases conflict. The following

subsections extensively discuss theoretical explanations and empirical tests of hypotheses derived out of these explanations.

2.4.1. Interdependence Promotes Peace: The Liberal Approach

Debates regarding the role of trade in promoting peace can be traced back to the ancient thinkers:

> "In the ancient Greek and Roman classics is to be found the doctrine that differences in natural conditions in different countries made trade between these countries mutually profitable. The early Christian philosophers took over this doctrine and gave it a theological flavor. God had endowed different regions with limited but varied products in order to give mankind an incentive to trade so that through a world economy they would become united in a world society, and as children of one God they would learn to love each other" (Viner, 1937, pp. 100).

Even though pacifying effect of trade is discussed in ancient writings, more systematic thoughts are referred to the liberal school of thought for modern periods (Angell, 1910; Blainey, 1973; Doyle, 1997; Kant, 1795; Viner, 1937). This peace promoting arguments are, in general, associated with economic and sociological factors. The desire of wealth for self-interested actors (i.e. people or states) underpinned by increased interaction resulting from trade may promote peace between states. Scholars, however, have tried to explain the trade-conflict nexus by relying on different causal mechanisms without digressing the domain of the liberal school of thought.

The liberal school, getting inspired, in general, from the notions of Kant, highlights the virtues of foreign trade and explains how economic relations motivate self-interested individuals, as well as states, for cooperation, mitigates misperceptions, and promotes ways of mutual understanding conducive to resolving conflicts of interest that could arise between states. In his seminal book, "Perpetual Peace," Kant (1795) proposes three principles whereby international peace could be established and secured: republican constitutions, cosmopolitan right, and international law and organizations. Cosmopolitan right with the condition of universal hospitality can be regarded as a reification of free movement of people and their wealth across borders:

> "[…] the right of foreign arrivals pertains […] only to conditions of the possibility of attempting interaction with the old inhabitants. —In this way,

> remote parts of the world can establish relations peacefully with one another […] (Kant, 1795, pp. 82)"

Kant's position, in fact, is projected from conceptualizations about the nature of human beings. Trading, as a form of contact with others motivated by self-interest, leads to promote interaction, exchange abilities, and thus, shape beliefs, motivations, and behaviors between interacting people. Giving credit to Kant's idea, many other early scholars maintain the pacifying role of trade in interstate relations. According to them, trade is a locomotive to achieve economic growth, political progress, and ideal morality through canalizing wicked characteristics of human nature into productive enterprises (Hirschman, 1945, 1982; Spiegel, 1991). As a prerequisite, however, they propound the free flow of trade and object any interference of state into it. Only when the free flow of trade is secured may trade render war obsolete through bolstering personal interests which are supposed to be inherently in conflict, as Mill (1848) asserts. In a similar vein, Montesquieu (1749) argues that "movable wealth" promotes peace; Smith (1776) claims that market interests accurse war; Paine (1791) says that trade is effective to attenuate motives like patriotism and military defense; Cobden refers to trade as "the grand panacea" (1878, pp. 36); Angell argues that it had become "impossible for one nation to seize by force the wealth or trade of another [...] war, even when victorious, can no longer achieve those aims for which peoples strive" (1910, pp. 60).

2.4.1.1.Sociological Aspects of Trade and Interdependence

For some liberal scholars, the pacifying effect of trade can be tied to factors, other than economic consideration. As Jean Bodin indicates, foreign trade is not only to be evaluated on "economic grounds but also to maintain communication and keep up the good feeling among nations" (Spiegel, 1991, pp. 91). Liberals build upon Kant's ideas and reckon communication and free flows of people as the sources of cordial relations between states, while they conceive the absence of these merits conducive to conflictual behavior (Blainey, 1973).

Having embraced those ideas, many liberal thinkers claimed that commerce civilizes and pacifies states and people as well as cures destructive prejudices (Forbes, 1997; Hirschman, 1945, 1982; Montesquieu, [1749] 1989). As Montesquieu said to stress the role of trade in the positive transformation of a human being: "Commerce […] polishes and

softens […] barbaric ways as we can see every day" (quoted in Barbieri, 2002, pp. 25). In 1781, Samuel Richard wrote:

> "Commerce has a special character which distinguishes it from all other professions. It affects the feelings of men so strongly that it makes him who was proud and haughty suddenly turn supple, bending, and serviceable. Through commerce, man learns to deliberate, to be honest, to acquire manners, to be prudent, and reserved in both talk and action […] he flees vice, or at least his demeanor exhibits decency and seriousness" (quoted in (Hirschman, 1982, pp. 1465).

Interstate interdependence, by virtue of the trade, is presumed by Classical Liberals (*a la* Bodin) to be a critical means forging the integration of societies. "How does interdependence shape the integration of societies and to what extent?" remains as another question. Integration and interdependence are two phenomena that underpin each other, and thus, distinguishing which promotes the other causally would be indistinguishable after a certain degree. The claim that more interaction between two states automatically leads to more peaceful relations needs some elaborations as well as refinements. Moreover, a very recent field study conducted in Nigeria reveals that social contact has no impact in eliminating prejudice (Scacco & Warren, 2018).

2.4.1.2.Economic Aspects of Trade and Interdependence

Relying more on the depiction of a "self-interested" individual in Kant's writings, many other early scholars stress the economic aspect of trade (i.e. cost-benefit calculations) in pacifying interstate relations. According to Mill, trade renders war obsolete through bolstering personal interests which are supposed to be inherently in conflict. Smith and Paine emphasize the power market's interest to attenuate motives like patriotism and military defense. In a similar vein, Montesquieu writes:

> "The natural effect of commerce is to bring about peace. Two nations which trade together, render themselves reciprocally dependent; if the one has an interest in buying and the other has an interest in selling, and all unions are based upon mutual needs" (1749, pp. 338).

In his seminal book "The Great Illusion," Angell talks about increasing needs (i.e. dependence) of industrial economies to inputs which are more easily and cheaply possessed through commerce than through coercion. Indicating the permeating nature of interdependence, Angell also conceives that interdependence might also create new interests

against war. For instance, financial interdependence assures that any adverse shock imposed on one economy can eventually hit the aggressor. Moreover, as functionalists and neo-functionalists suggest, interstate trade bonds and newly established institutions to facilitate trade and meet the needs of interest groups might lead to positive spillover inducing further cooperation in various areas (i.e. social integration, transfer of domestic alliances) (Deutsch et al., 1957; Haas, [1958] 2008; Mitrany, 1966).

Getting encouraged from notions indicating the role of economic benefits in an interdependent relationship, modern-time liberals argue that pacific behavior results from the economic interests, not from high interaction and being civilized. These kinds of explanations differ significantly from classical liberals' arguments that trade civilizes people and states. As an important implication of such an explanation, business groups are expected to be more pacific and antiwar compared to other groups of society and they can play a role to pacify government's actions towards other countries for the sake of their business (Domke, 1988). To influence states' behaviors, the interests of business groups should also be represented or reflected effectively in states' decision-making processes. Therefore, in democratic societies, where public opinion has a greater impact on policymakers, economic interests of business groups prevail (Domke, 1988; Ray, 1995).

Alternatively, in non-democratic states, where since the size of winning coalition is inherently smaller, particular business cliques, as powerful economic supporters of a regime, might be much more effective of influencing leader's decisions (Bueno de Mesquita, Smith, Siverson, & Morrow, 2003). Interests of those business groups might have enhanced impact compared to those in democratic states, either in the peaceful or belligerent way. Therefore, optimistic arguments about the impact of business groups on peaceful relations rest on a particular assumption—business interest always prefers peace over conflict. If, however, business groups gain profits out of the war, then economic interests may induce conflict, rather than peace (Barbieri & Levy, 1999).

2.4.1.3.Underlying Causal Mechanisms

Economic considerations within an interdependent relationship have received more attention in explaining the impact of interdependence on interstate relations. However, to substantiate these arguments, a more formal and systematic articulation of causal mechanism underlying

relevant theories is necessary. To that end, Polachek (1980) provides one of the first research endeavors using expected utility model of trade and conflict and ease our understanding of the dynamics affecting trade–conflict nexus.

Polachek presumes that varying trade patterns between states appear due to given and non-homogenously distributed endowments across countries.[2] For a rational leader aiming to maximize the social welfare of his or her nation, benefits gained from trade would affect his or her calculations, and thus, foreign policy behavior vis-à-vis a trading partner. Simply put, in the leader's calculations of expected utility, the cost of conflict includes the loss of trade benefits as a result of possible interruption of trade with the partner, which is referred to as the opportunity cost.[3] Therefore, a conflict with a trading partner would result in the welfare losses. As gains from trade increase or trade ties expand with a partner, then prospective losses as a result of conflict with that partner would also increase, which, in turn, dilutes leaders' incentives to involve in a conflict, and thereby, decreases the likelihood of conflict. Polachek's expected utility model frames that conflict can only produce an adverse effect on welfare, thereby, refraining from a conflict would always maximize welfare (Barbieri, 2002).

Using a similar approach, but this time relaxing the assumption that conflict always produces an adverse effect for trading states, Rosecrance (1986) argues that a state may maintain trading relationships if use of force (i.e. military conquest of resource-rich areas) appears as an inferior (i.e. costly and inefficient) option to that state. Unlike Polachek's model, Rosecrance describes leaders to choose between trade and conquest. Although conquest is an inviable option in Polachek's model, as Liberman (1996) demonstrates, this option still pays off under certain conditions. From these two models, we can assume that relative utilities resulting from conflict and trade can change across time and space as well as the type of trading relationship (i.e. dyadic relationships) (Barbieri, 2002, pp. 25).

Very similar to the opportunity cost argument, Crescenzi (2003) introduces the exit cost argument to explain the relationship between economic interdependence and conflict. In his game theoretical model, if the revisionist side is on the verge of making a decision about

[2] This presumption fits perfectly to energy trade in which the direction in trade flows depends on heterogeneously distributed energy resources

[3] Polachek & McDonald (1992) show that the loss of welfare gains as a result of a conflict occurred between two states could also emerge as inferior terms of trade.

the way it could get what it demands from a target, it prefers the option with the lowest cost. The revisionist state could use its economic ties and make a threat of exit from the trading relationship to extract a concession from an otherwise unwilling partner. When the exit cost inflicted by the revisionist state exceeds the target's cost threshold, the revisionist makes demand and the target complies with it. Crescenzi shows that the higher exit cost means the higher probability of low-level conflict but at the same time the lower probability of high-level conflict. Another implication that his model provides is that the relationship between interdependence and conflict depends not only on the costs inflicted by a partner and the ability to endure that cost, but also the issues at stake—high-level stakes render exit cost argument void and economic interdependence ineffective:

> "[…] Canadian dissatisfaction with American fishing ships is qualitatively different from Uganda's opposition to Rwanda's ethnic cleansing policy. Where ethnic or national feelings are involved, economic benefits from interdependence may not work as well as they are supposed to in other settings. Even within territorial conflicts, there is a striking difference between tangible (e.g. land, water, oil field) and intangible issues (e.g. historical possessions, important homelands, sacred sites or identity ties)" (Lu & Thies, 2010, pp. 364).

Contrary to Crescenzi's expectations, however, Lu & Thies (2010) find that trade interdependence—across different measures—significantly decreases militarized dispute onset—across different issue types.

Some liberal scholars are not convinced from the opportunity cost argument in explaining the pacifying effect of interdependence and embrace the notion of trade as costly signals. According to them, if higher dependence reduces the likelihood of initiating a dispute, then this means, the initiator is less willing to fight and has lower resolve. The similar argument is valid also for a target: in case of high dependence, the target is also less willing to retaliate and more willing to accept concessions, and thus, the likelihood of the initiator to start a dispute increases. As a result, trade has "an indeterminate effect on the initiation and escalation of the international conflict" (Morrow, 1999, pp. 481). As should be clear, opportunity costs in terms of loss of economic gains due to an interruption in trade cannot deter disputes (Gartzke, Li, & Boehmer, 2001).

Instead, opportunity cost can be used by states to signal their unobservable resolve through credible communication and it may help them reach a peaceful agreement following an initiated dispute (i.e. during the conflict), without resorting to more violence:

> "The more resolute a state is, the higher its value for war, and the more likely that it will find continuing the crisis more attractive than making concessions" (Morrow, 1999, pp. 482).

Sacrificing beneficial economic relations and taking a risk of militarized dispute, a state could credibly communicate its resolve, which reduces uncertainty in a bargaining space and increases the possibility of a settlement short of war. Therefore, interdependence decreases the likelihood of escalation, not necessarily that of initiation, by increasing the range of costly signals of resolve in a crisis.

The costliness level of the signal in trading relationships depends on the nature of market power and the costs of adjustment following a would-be conflict with a partner and trade disruption. Since each commodity cannot be the same in terms of the strategic importance level, the cost of signaling may vary with respect to commodity type. This fact suggests that trade relationships should be disaggregated and analyzed industry by industry (Stein, 2003).

An empirical investigation of costly signaling explanation, however, still remains controversial (Oneal et al., 2003). Moreover, most of the empirical studies have relied on opportunity cost explanation because they believe in that without potential trade losses, the signaling model would not explain an inverse trade-conflict relationship. As should be clear, even the signaling model relies on opportunity cost argument (Polachek & Xiang, 2010).

2.4.1.4.Empirical Investigation of Liberal Hypotheses

Based on previously discussed propositions, the liberal school expects that states hesitate to initiate conflict against their trading partners not to lose the welfare gains resulting from the mutual trade (Polachek, 1980). Most of the empirical studies have demonstrated the negative relationship between trade and conflict (Domke, 1988; Gasiorowski & Polachek, 1982; Oneal et al., 1996; Oneal & Ray, 1997; Oneal & Russett, 1997; Polachek, 1980, 1997; Polachek & McDonald, 1992; Sayrs, 1989).

Liberal arguments related to interdependence do not just focus on the volume of trade, which has been used as a conventional measure, but the type of trade between states (Polachek, 1980). As Polachek (1980) shows, for instance, that a country (i.e. Saudi Arabia) exporting a strategic commodity (i.e. oil) is freer to act belligerently, whereas importers of strategic commodity tend to minimize hostility towards the exporter. Measuring the elasticity of supply and demand for commodities traded between states, Polachek & McDonald (1992) reiterate that as a state's import and export demand and supply becomes more inelastic to its partner, the amount of net conflict directed to the partner gets smaller. Oneal et al. (2003) maintain that economically important trade has a substantive important effect in reducing dyadic militarized disputes, even after controlling for the impact of past conflicts.

Echoing Keohane & Nye (1977), the vulnerability can partially explain such a behavior of the state: when the commodities traded are of strategic importance (i.e. inelastic demand for exported products abroad, or for imported goods at home) states may feel themselves in a more vulnerable situation vis-à-vis their partners. The reason for such a feeling is that cost of exiting trading relationship is a function of change (i.e. cost of changing the trading route, new investments, if required) and the availability of alternatives. The high cost of change and failing to find substitutes of a specific commodity from other suppliers with competitive prices increase the vulnerability and lead importer countries to have more conforming behavior toward suppliers, which results in relatively peaceful, if not fair, resolutions short of conflict.

These results clearly show that what you buy or sell matters in a trading relationship. Elasticity level of the demanded commodity to a trading partner is a good measure helping identify the strategic importance of a relationship. The elasticity level to a partner, however, may change over time depending on changes in the price of the commodity, domestic consumption levels, needs, tastes, and preferences. Rapidly changing technology is also conducive to this change. For instance, during the 1990s and early 2000s, almost everyone in Turkey had used Ericsson or Nokia cell phones, the former was imported from Sweden and the latter from Finland. Observing the trade dependence of Turkey on these two countries during that period would not be surprising. For the last ten years, however, technology, as well as tastes and preferences of people, have enormously altered. Today, almost everyone in Turkey uses either Apple or Samsung branded cell phones, as a result of which, the U.S.

and South Korea have replaced Sweden and Finland as main suppliers of cell phones (International Data Corporation, 2000-2016). Considering these possible changes in trading relationship patterns, Barbieri (2002) remarks that measurement of the strategic importance of different trade types or commodities is difficult and requires considerable spatiotemporal coverage of interstate trade figures in detail so that we could capture the strategic importance of commodities changing over time. To circumvent these limitations, researchers like Polachek, have relied on other measures to proxy the strategic importance—elasticity of demand to supplier country. Their efforts, however, explain more of the relative importance of a partner, not commodities traded (e.g. relative importance for a consumer country of energy resources vs. luxury goods).

The strategic importance of goods cannot only be measured through the price of goods and trade volumes in a given trading relationship. If goods have some security implications for states, then each side becomes more willing to muscle to frame trading relationship according to its own interest, which in turn may lead to conflict. Contrary to the liberal expectation, Vogel (1992) suggests that trade of strategic resources and high-tech products, which are key to produce weaponry, increases the likelihood of interstate conflict. Moreover, if strategic goods are appropriable, then this might also boost a state's incentive to use force against its partner. Empirical findings based on dyad-level analysis show that trade is less effective in pacifying interstate relationship when traded goods of interest are chemicals or high-technology products, as well as are easier to appropriate by force (Dorussen, 2006).

Liberal theory, in fact, says that states maintain trade relations with their partners so long as these relations serve to their interest (Russett & Oneal, 2001). Recalling this expectation, Oneal et al. (2003) remark that liberal theory also predicts the possibility that militarized conflicts could reduce trade. They also point out that empirical studies estimating the existence of a reciprocal relationship between trade and conflict have fallen short of detecting the extent to which a militarized dispute affect the trading relationship, compared with the reversed. According to their logic, the likelihood of conflict may still be lower for dyads having a long history of economic interdependence experiencing a recent militarized dispute than those had never been interdependent. In fact, empirical studies had shown that the effect of trade on conflict is greater than the effect of conflict on trade (Kim, 1998).

Employing distributed-lag models, Oneal et al. (2003) show, again, that the pacifying effects of trade are both statistically and substantively significant, and robust. Their analyses also confirm the reciprocal relationship between trade and conflict, but they maintain also that the effect of a dispute is short-lived—for only one or two years.

Although a remarkable number of empirical studies have shown that economic interdependence has an overwhelming pacifying effect on interstate relations, various criticisms have arisen against the liberal theory. The disparity in empirical results of has also lead scholars to approach liberal account with more prudence and underpinned the prevalence criticisms. The following two subsections will discuss the aspects that liberals have overlooked and failed to explain effectively.

2.4.2. Type of Interdependence Matters: Which Aspects Do Liberals Overlook?

Much of the debate regarding the relationship between trade and conflict centers on the puzzle of whether the benefits of trade preponderate the costs of being economically interdependent. That's why, scholarly endeavors, so far, have inspected factors changing the cost-benefit calculus, the most important of which is the type of trading relationship that exists between states. The divergence between the critics and advocates of free trade originates from the magnitudes of weights that each group assigned to costs or benefits resulting from free trade.

Liberals argue that trading partners would be better of both economically and politically, compared to otherwise trading countries in a more restricted way. Trade, as a form of contractual relationship, is reckoned to mitigate misperceptions, cure prejudices, enhance understanding, converge different cultures, and facilitate cooperation in other areas. Being cognizant of the gains of trade and the costs of being interdependent as well as their magnitudes changing over time, liberals defend that trade has net positive benefits for each participant state. Liberals talk over the absolute benefits of trade for the partners without contemplating the distribution of these benefits between them. With the auxiliary assumption that trade linkages emerge voluntarily, the liberals force us to think that, as a rational actor, states extract benefits out of the trading relationship; they would otherwise quit the relationship. Trade increases gains through the exchange (better price) and economic specialization (efficiency).

Given this quite optimistic portrayal of liberals, abandoning trade for countries is a Pareto inefficient case where both sides get worse off. Then, why do we observe countries making an unfavorable choice by abandoning trade and engaging in a conflict? Those asking this question, therefore, should ponder the assumption that trade provides more benefits than costs. Scholars who suspect whether states concern really about absolute gains describe liberal optimism as fallacious because absolute gains might be subordinate to relative ones.

Criticisms to the liberal approach mainly concentrate on its assumption that trade provides net benefits to participants in any case. Relying on Marxist notions, dependency theorists, who focus exclusively on inequalities between trading states, namely developed and developing states, spearhead the criticisms. Building partially upon the relative gains assumption, dependency theorists argue that the gains of trade are enjoyed disproportionately by developed states, and thus, the course of development for developing states has been retarded. This situation, in turn, exacerbates inequalities between nations (Myrdal, 1957; Seers, 1963; Singer, 1950). Dependency theorists claim that the reason for why we observe such a cleavage among countries—developed vs. developing—is due to relations between states, not to domestic factors that developing countries have. As Cardoso remarks, economic growth might occur in developing areas, but that kind of growth imposes "capitalist dependent development" (Blomström & Hettne, 1984, pp. 67, 75).

Rejecting the liberal assumption, Neo-Marxists suggest that trade and interdependence are only beneficial for the powerful which may exert political and economic manipulations over the powerless. Therefore, as opposed to Polachek's (1980) model, calculations of the expected-utility models are different based on power relations of dyads (Tétreault & Abel, 1986). Moreover, if relative gains dominate policymakers' decisions, despite extant absolute gains, dynamics of trade-conflict nexus may change significantly (Baldwin, 1993; Grieco, 1990; Mastanduno, 1993; Powell, 1991; Snidal, 1991), because unequal distribution of trade benefits may stimulate tension between states. In sum, the impact of trade on interstate relations is contingent upon the distribution of costs and benefits as a result of a trading relationship.

Whether dependence is symmetrical or asymmetrical affects the course of interstate relations where the more dependent state may incur greater costs—political or economic—

and gain fewer benefits. The less dependent side may take advantage of having better bargaining positions to extract further concessions on political and economic issues by threatening to sever existing trade ties. Symmetrical ties may promote peace (Hegre, 2004), but asymmetrical dependence creates tensions that may manifest themselves in conflict (Balogh, 1963; Cooper, 1972; Emmanuel, 1972; Gasiorowski, 1986a, 1986b; Gasiorowski & Polachek, 1982; Hirschman, 1945; Richardson & Kegley, 1980; Wallensteen, 1973). As Gasiorowski (1986a, 1986b) and Kegley & Richardson (1980) demonstrate, the political influence of dependence prevails more in asymmetrical ties and trade may have negative consequences: asymmetric ties tend to produce more hostile relationships. Only when the costs of interdependence, measured as the volume of trade as a percentage of national income, decrease does economic relationship negatively correlate with conflict.

Hirschman is one of the first contemporary scholars explicating "how relations of influence, dependence, and domination arise right out of mutually beneficial trade" (1945, pp. vii). He remarks:

> "The Nazis . . . had not perverted the international economic system, they had merely capitalized on one of its potentialities or side effects; for "power elements and disequilibria are potentially inherent in such 'harmless' trade relations as have always taken place, e.g., between big and small, rich and poor, industrial and agricultural countries—relations that could be fully in accord with the principles taught by the theory of international trade" (Hirschman, 1945, pp. vii).

Accepting the idea that all participants of trade benefit from it, Hirschman focuses on the relative importance of a trading partner while grounding his idea of dependence: if the trade partner is indispensable for the state and the state is unable to find alternative options to substitute what it needs, then dependence exists. Lack of ability and freedom to diversify trade volumes (or concentration) among existing or prospective partners, when needed, constitutes the core of dependence for the state. Therefore, asymmetrical dependence can serve as a tacit potential tool for the less dependent side in order to expand its political clout. Liberals assume that the more dependent state enjoys more economic gains from a trade with a large state than the large state does. Hirschman, however, underscores that the more dependent side might fear of losing trade gains derived from a relationship with a more powerful partner, and thus, the more powerful side might have the leverage in a bargaining table and use this leverage to secure further concessions from its partner.

Building upon Hirschman's opinions, Keohane & Nye (1977) further explicate the dynamics that exist in asymmetrical interstate relations. Even though they do not explicitly refer to trade–conflict nexus, they argue that possible manipulations or coercive behaviors resulting from asymmetrical relationships underpin animosity, rather than peace as described by liberals. Resorting to implicit threats and "structural violence" are, in fact, actions to violate peace in some way (Galtung, 1971), even they are used by a dominant party to suppress potential conflict before it erupts (Russett, 1967). In addition to implicit manipulations, both economic and political, the more powerful state in these relationships is more likely to employ military means against underdogs which are economically dependent upon it (Wallensteen, 1973; see instances between the United States and Latin American states).

Theoretically, interdependence means that costs are inflicted mutually upon the participants because they may incur the external influences of their partners (Keohane & Nye, 1977). Even defenders of extensive economic relations, like Cooper, are cognizant of the risks to national autonomy that may arise from interdependence:

> "Like other forms of international contact, international economic intercourse both enlarges and confines the freedom of countries to act according to their own lights. It enlarges their freedom by permitting a more economical use of limited resources; it confines their freedom by embedding each country in a matrix of constraints which it can influence only slightly, often only indirectly, and without certainty of effect […] As with a marriage, the benefits of close international economic relations can be enjoyed only at the expense of giving up a certain amount of national independence, or autonomy, in setting and pursuing economic objectives" (Cooper, 1968, pp. 4).

Therefore, the dilemma exists for states to be resolved: obtaining the benefits of interdependent trade relationship without sacrificing national objectives. Cooper admits that resolution of this dilemma is relatively difficult for the more dependent state because the more dependent one is somewhat forced to behave in compliance with the wishes of the less dependent partner.

Correspondingly, the impacts of trade dependence transcend the economic domain and come into play in foreign policy behavior. Kegley & Richardson (1980) point out that economic dependence may also affect the tendency of states in foreign policy compliance.

Since the more dependent state is subject to the demands of the less dependent partner regarding foreign policy decisions, the expectation of convergence in foreign policy decisions between these states becomes quite possible. Many policymakers optimistically portrayed increasing trade ties with partners as a constructive engagement to change their domestic and foreign policies. For instance, President Clinton repeatedly stated that the expansion of trade was an important means to have peaceful relations between the U.S. and China, as well as a means that may foster democracy in China.[4] In contrast to these portrayals depicting that the expansion of trade and increase in interaction would culminate in peaceful world society, this convergence may result from relatively unfavorable kinds of interactions between states, like coercion, economic sanctions or threat, each of which constitutes a challenge for national autonomy.

2.4.3. Interdependence Enhances Conflict

The question that IR scholars have debated on has been whether higher levels of interaction in trade is good or bad for peace. Criticisms directed to liberals have been on both sociological and economic aspects of interdependence. The least moderate group of critics against the liberal expectation—trade promotes peace—, namely, realists argue that minimization of interaction contributes more to peace simply because increased interaction and interdependence may elucidate preexisting disagreements and heighten hostility (Waltz, 1979). Similarly, Coser argues "conflict is more passionate and more radical when it arises out of close relationships. The coexistence of union and opposition makes for the peculiar sharpness of the conflict" (Coser, 1956, pp. 432).

2.4.3.1.Criticisms against the Social Contact Theory

Negating the contact hypothesis, Waltz (1979) embraces the notion that an increase in interaction via trade promotes a discordant relationship. One of the most striking illustrations undermining the arguments of interaction supporters is "the frequency of civil wars shatters the simple idea that people who have much in common will remain at peace" (Blainey, 1973, pp. 30). Skeptics about the outcomes of dense interaction attribute their underlying causal

4The New York Times, "The Clinton Record: Foreign Policy; Clinton's Big Three Objectives Include Peace Through Trade,'' 29 July 1996.

mechanisms to Freud's (1938, 1948) conception of ambivalence in intimate relations (Coser, 1956). According to Freud, developing enmity towards other people is quite inherent regardless of whether these people are in our closer circle or not. What differs, however, is keeping peace in intimate relationships is of interest to individuals and is more likely. Therefore, individuals having intimate relationships are more likely to suppress their enmities. In case of conflict eruption, however, individuals having intimate relations are inherently more likely to experience intense levels of enmity than those having limited ones.[5]

Neo-Marxist scholars build on the vices of interaction and argue that if interaction is undergirded with capitalist motivations which inherently produces competition over markets and resources (Baran, 1957; Sweezy, 1942), then violent conflict between competitors (i.e. major powers) as well as a race of dominating less powerful states become inevitable (Sayrs, 1990). Forbes's (1997) comprehensive review of the literature and empirical evidence on the contact hypothesis, however, hints that interaction at different levels may lead to varying impacts: interactions at individual level cure prejudices and foster relations whereas those at state level induce conflict. Therefore, types of interactions need to be parsed out while examining arguments relevant to the social contact theory.

2.4.3.2.Criticisms on Economic Aspects of Liberal Hypothesis

Realist approach, in general, see trade as a subordinate factor affecting dynamics in international politics (Blainey, 1973; Bueno de Mesquita, 1981; Buzan, 1984; Levy, 1989; Ripsman & Blanchard, 1996); economics considerations of states have been classified under the domain of "low politics." As Keohane & Nye (1977) suggest, however, such a hierarchy is no longer feasible in a highly interdependent world. Even though it is recognized as an important tool in international politics, trade is presumed insufficient to deter states from conflict. If trade provides strategically important commodities, then states may reconsider the situation in case of a potential conflict. Still, realists believe that decision-makers do not consider the potential loss resulting from an interruption in trade when they are to engage in conflict.

[5] In fact, concepts on which liberals and critics ground their arguments regarding the conflict inherently differ. While liberals argue the impact of interaction on conflict onset, critics focus on the process after the onset took place. I will discuss this distinction more deeply in empirical parts.

Despite the underestimation of economics, realists, in general, show an utmost concern about how benefits are distributed between partners in a trading relationship if any. Realist scholars suspect whether states concern really about absolute gains and describe liberal optimism as fallacious because absolute gains might be subordinate to relative ones. Their logic is as follows: power is an essential factor for survival and it is also relative, and thus, the relative power is a function of how costs and benefits are distributed between states. Since "conflict is the essence of the pursuit of power" (Hawtrey, 1930), then states inevitably take account of relative costs and gains (Gowa, 1994).[6] Gowa relates the security concerns with trade relationships and discusses that states prefer to trade with their friends to deprive their foes of the trade benefits. Besides the potential income that foes gain from trade, increased ability in specialization, and thus efficiency, as a result of trade is what makes states refrain from participating in a trading relationship; because increased efficiency may lead to a better reallocation of resources and this improvement could allow partners to redirect more resources toward the military. The relative-gain notion reckons one side's gain in a trading relationship as other side's potential loss. This notion is not only a perception but also an objective reality shaping states' decision-making process in favor of conflict. As a result, realists reject the notion that trade will pacify relations between states.

Resting on the idea of the distribution of the costs and benefits, some critical theorists condition interstate relations on how a state conceives of the dependence engendered towards its partner. According to them, the negative consequences of trade stem from the dependence that it causes. Therefore, the impacts of trade on interstate relations may change according to the type of interdependence between states—symmetrical or asymmetrical. Asymmetrical interdependence means that the costs and benefits are unequally distributed to each side where the more dependent side may incur disproportionate costs and relatively fewer benefits. Such an asymmetry, in turn, can exacerbate the security dilemma "inherent in interstate relations" and high dependence gives rise to a systemic incentive to use force in order to eliminate vulnerability (Barbieri, 2002, pp. 21).

As dependency theorists stress, "how asymmetrical dependence affords the more independent state a position of power over the dependent state" (Barbieri, 2002, pp. 13) is

[6] In fact, one type of unequal distribution of costs and benefits in interdependence could be through interruptions in strategic supplies (Uchitel, 1993).

worth to be discussed because the dependent side becomes vulnerable to political and economic manipulation of the more independent side. Additionally, some radical economists believe that the costs and benefits of trade are highly asymmetrical in relations of dependence. Definition of Dos Santos for dependence is the one that dependency theorists widely use:

> "By dependence, we mean a situation in which the economy of certain countries is conditioned by the development and expansion of another economy to which the former is subjected. The relation of interdependence between two or more economies, and between these and world trade, assumes the form of dependence when some countries (the dominant ones) can expand and can be self-sustaining, while other countries (the dependent ones) can do this only as a reflection of that expansion, which can have either a positive or a negative effect on their immediate development" (Dos Santos, 1970, pp. 231).

Empirical evidence, however, shows that extensive interdependence increases the likelihood of conflict regardless of the degree of asymmetry. Barbieri (1996) points to a curvilinear relationship between interdependence and dispute occurrence: low to moderate interdependence reduces conflict whereas extreme interdependence whether it is asymmetric or not increases the likelihood of conflict (Barbieri, 1996).

In a similar vein, the influence of foreigners through trade is another factor pointed out by the critics. Foreshadowing realism, the importance of economic self-sufficiency and risks of being dependent on others were emphasized by the philosophers such as Aristotle and Plato (Spiegel, 1991). The overriding motivation for such reservations against trade stems mainly from the concerns about possible infringements against independence incurred by vulnerabilities to be exploited in the future. Dependence could pave the way for opportunities for manipulation by the less dependent side over the other, and of exerting influence. Beyond the fierce debate throughout the history between the protectionists and mercantilists, where exports were encouraged according to the latter view whereas exporters were viewed as traitors to the former view, the underlying concern has been about the infringements against state's sovereignty by means of trade. In a more concise way, Neff (1990) notes that discrepancy exists for those advocating the formation of a global economic community in terms of prioritizing interests—national vs. supranational interests. The critical question is, as Barbieri raises: "Can the bonds created through economic ties offer sufficient

restraints to prevent states from pursuing national objectives that may ultimately lead to conflict?" (Barbieri, 2002, pp. 10).

2.5.Advanced Issues in Interdependence-Conflict Nexus

2.5.1. Conditionality Problem

While explaining the link between trade and interstate relations the unconditional liberal hypothesis—trade reduces conflict—sees external factors, such as regime type, economic structure, level of development, economic capacity or foreign policy affinity, independent of trade–conflict calculus (Barbieri, 2002, pp. 11). Empirical evidence, however, overwhelmingly shows the conditionality in pacifying effect of trade on conflict (Gelpi & Grieco, 2008; Hegre, 2000). Democracies, for instance, are found to be less likely to initiate militarized disputes against their important trade partners. Recalling Bueno de Mesquita et al. (2003), this finding is quite intuitive because democratic leaders are expected to attach more significance on foreign trade to sustain economic growth, and more importantly, to keep their office.

Apart from the regime type, future expectations on a trading relationship may shape trade–conflict calculus. Copeland (1996) suggests, for instance, not to just focus on current trade figures of states to estimate conflict probability, but future expectations (i.e. future gains, losses or vulnerabilities) of them from trade relations. Only when a state expects higher dependence and is optimistic about the future trade does interdependence bring about peace.

Types of commodities (i.e. agriculture, chemical, energy) traded and their trading patterns (i.e. export or import) may condition countries' tendency to involve conflict with others. Investigating the impact of exports and imports patterns in five different sectors on militarized dispute initiation, Li & Reuveny (2011) find that while increases in the initiator's imports of agriculture/fishery, energy, and chemical/mineral goods and exports of miscellaneous consumption goods decrease the likelihood of dispute initiation, increases in the initiator's exports of energy and both imports and exports of manufactured goods increase this likelihood.

The ability of states to supply their needs from alternative suppliers can also change trade–conflict calculus. Studies suggest that as the number of alternative trading partners

increases, the pacifying effect of trade on conflict remains limited (Bohmelt, 2010; Dorussen, 1999; Gartzke & Westerwinter, 2016).

2.5.2. Simultaneity Problem

The direction of causality in debates of trade and conflict relationship has mostly been presumed as unidirectional—from trade to conflict. However, conflict may also give rise to a decline in trade. Contrary to unidirectional presumption, the reciprocal causal mechanism may exist, and if so, that might lead to biased conclusions. In fact, realists have argued that "trade follows the flag," rather than trade affects politics (Levy, 1989). The foci of discussions, here, is security interests and their influence on trading relations (Gowa & Mansfield, 1993; Pollins, 1989b). As an implication of the concerns related to relative gains compared with potential adversaries, states do not want their adversaries to forge military power out of commercial gains. Therefore, they tend to restrict sales of strategic goods to their foes (i.e. key raw materials or technological products with military weaponry) (Oneal et al., 2003) or manipulate trading patterns in favor of their friends in a way to keep balance of military power in control (Gowa, 1994; Grieco, Powell, & Snidal, 1993). To admit, this approach is shaped by a strict "state-centered" perspective. This perspective, however, has come to lose prominence since "trade flows are affected by the decisions of social actors at every level" (i.e. individuals, interest groups, other economic agents (Keshk et al., 2004; Li & Sacko, 2002; Pollins, 1989a, 1989b).

Some of the empirical studies address this problem and examine whether a reciprocal relationship exists or not (Gasiorowski & Polachek, 1982; Reuveny & Kang, 1998). In their analyses of specific dyads, Reuveny & Kang (1998) find that trade and conflict Granger-cause each other in most of the commodities. They also show that the direction of Granger causality tends to be from conflict to trade when traded commodities are strategically important (e.g. minerals, iron and steel, fuels, scientific equipment). Extending Reuveny and Kang's analysis of all dyadic relationships, Keshk et al. (2004) demonstrate a unidirectional causality, which is, however, contrary to common sense—conflict reduces trade. Their finding charges the liberal proposition with being "an artifact of simultaneity bias" (Keshk et al., 2004, pp. 1156). Some following empirical studies have also verified Keshk et al.'s findings. Kim & Rousseau (2005) re-analyze Russett and Oneal's dataset and show that the

impact of economic interdependence disappears after correcting for the simultaneity problem.

Introducing a conditionality of ex-ante conflict expectation, Li & Sacko (2002) investigate the relationship between conflict and trade. They show that only ex-ante unexpected conflicts substantially reduce bilateral trade ex-post.

2.6.Appraisal

On the relationship between trade and interstate relations, liberal theorists asserted that "dividends from peace" enlarge and strengthen the dovish camp in trading countries, hence, leading to more cordial relations between trading states. The realists, in turn, have countered this claim by asserting that trade tends to follow the flag, makes states vulnerable to volatilities in critical supplies, and, hence, increases the likelihood of conflict (Barbieri, 2002). Eventually, the liberal-realist debate evolved as the focus shifted on the nature of specific goods traded (Dorussen, 2006), and on economic ties besides trade, such as foreign direct investment (Rosecrance & Thompson, 2003).

All these disparities in results should, in fact, lead us to address three important issues in explaining trade–conflict relationship (Mansfield & Pollins, 2001):

i. More refinement in theoretical explanations and causal mechanisms underlying the relationship between interdependence and conflict.
ii. The conceptual definition and operationalization of interdependence, as well as conflict
iii. Consideration of conditionality in the effects of interdependence on conflict.

In fact, scholars have directly or indirectly addressed these issues in their studies so far. Scholars have refined theoretical explanations (Hirschman, 1945; Keohane & Nye, 1977; Waltz, 1979), explicated in underlying causal mechanisms (Polachek, 1980; Morrow, 1999; Gartzke et al., 2001), come up with reliable and replicable definitions and operationalizations (Oneal et al., 1996; Oneal & Russett, 1997; Barbieri, 1996), and contemplated possibility of conditional associations (Gelpi & Grieco, 2008; Hegre, 2000; Dorussen, 1999; Li & Reuveny, 2011). After all these scholarly endeavors, "what appears clear is that not all economic relationships, or all contacts, produce the same effect" (Barbieri, 2002, pp. 37).

Energy interdependence offers an interesting avenue of research to further the agenda on interdependence and interstate relations. While few in number, relevant studies all suggest that energy, as a commodity, needs to be studied separately. Energy resources are strategic and not easily substitutable, hence directly affect a state's ability to wage war (Colgan, 2013), therefore the use of military becomes a distinct option when states enter disputes with their energy trading partners (Fearon, 1995). Trade in energy resources also tends to provoke conflict since such goods are appropriable (Dorussen, 2006). In a similar vein, being highly reliant on specific types of commodities, like energy—which are hard to substitute or of which suppliers are inherently non-diversifiable, at least in the short-term—may produce vulnerability in consumer countries against suppliers, and hence asymmetrical trading relationship within dyads (Hirschman, 1945). Resultant asymmetrical ties may produce more hostile relationships within dyads (Kegley & Richardson, 1980). Alternatively, energy-dependent countries, to mitigate or eliminate their vulnerability, could resort to militarized actions against their resourceful partners (*a la* Waltz, 1979; Barbieri, 1996). On the contrary, vulnerability stemming from a high level of reliance to specific commodities, hence their suppliers, may implicitly force more dependent side to comply with the wishes of less dependent side or curb more dependent side's incentives to engage in conflict against its less dependent partner (Keohane & Nye, 1977). To investigate these divergent scholarly claims and expectations specifically within an energy trade framework, this thesis advances this line of research by employing a dyadic design, developing a sophisticated measure of energy interdependence that takes all primary energy resources, their corresponding import, and consumption figures, and a country's own domestic resources into account.

To set the stage for my further arguments regarding empirics of energy interdependence and interstate relations, the following chapter asks the following question, "what is energy interdependence a case of?" and gives an extensive review on (i) why energy differs from other commodities traded, (ii) how energy motivates countries to use it as a foreign policy weapon, and (iii) from which aspects energy trade affects interstate relations.

CHAPTER 3

3.1.Introduction: What is Energy Interdependence a Case of?

Energy is a fundamental input for almost all human activity. For almost every society throughout history, energy resources and the control of them have always been of interest. Since energy has been an integral part of economic prosperity and military security, it differs from other tradable commodities. For instance, energy, in terms of the per capita consumption has broadly been acknowledged as a prominent proxy of power (SIPRI, 1974, pp. 11). Likewise, energy consumption constitutes one of the six main components for the Composite Index of National Capabilities measure.

Owing to its significance in economic and political aspects, energy has been discussed as an important factor in shaping foreign policies of states. The prominence of energy and energy resources in political science have also been discussed in many aspects. Energy resources and relations based on these resources have frequently been associated with economic and political consequences by scholars, such as the resource curse, the symptoms of which include poor economic growth, authoritarianism, democratization, inter-/intra-state wars (see *inter alia*, Colgan, 2013; Collier & Hoeffler, 2004; Fearon & Laitin, 2003; Ross, 1999; Sachs & Warner, 2001).

Note also that energy is not a static issue—it has constantly changing dynamics as technology advances. This dynamic nature in energy issues not only influence states' domestic and foreign policy objectives, if not at an increasing rate but also influence our research agenda as IR scholars. For instance, almost a decade ago several studies had started a debate about the total amount of available oil reserves (Campbell & Laherrère, 1998; Clarke, 2009; Deffeyes, 2006, 2008; Simmons, 2006; Simon, 1996). Building upon this debate, Colgan (2011) drew our scholarly attention to another aspect and pointed out an important and very interesting trend having been overlooked in this debate: declining oil

reserves in advanced democracies. In 1950, the share of the global supply for oil that is produced by the Organization for Economic Cooperation and Development (OECD) member democracies was over 50%. In the 1980s, this share was between 30% and 35%. By 2030, according to projections by the International Energy Agency (IEA) at the time, this share would have decreased to below 20%. Coupling with increasing global demand, states might increasingly depend on oil coming from non-democratic regimes and/or weakly institutionalized states (e.g. the MENA region). More interestingly, an estimate given by (El-Gamal & Jaffe, 2009) indicated more than half of future supply potential is projected to come only from Saudi Arabia, Iraq, and Iran. Today, however, all these experts discuss the shale revolution taking place in the U.S.—its impact on energy market, prices, political relations—(Westphal, Overhaus, & Steinberg, 2014), the breakthrough in renewables (especially in wind and solar energy) (Sheikh, Kocaoglu, & Lutzenhiser, 2016), and recent developments in Liquefied Natural Gas (LNG) transmission, storage, and conversion technologies (Krauss, 2018). In what ways do these changes in the global energy market influence the dynamics of international relations and international political economy? Does a combination of regime type and control over energy sources hamper international peace and security? Does energy interdependence promote the cordial relationship between states or the conflictual? All these questions are timely and overwhelmingly critical questions to be asked and answered by relying on the scholarly framework.

Regarding the role of energy in world politics (i.e. energy interdependence and its impact on interstate relations), most of the studies, so far, have relied on qualitative case studies (Aalto, 2008; Binhack & Tichý, 2012; Casier, 2011; Dimitrova & Dragneva, 2009; Harsem & Claes, 2013). These studies form an important basis for our systematic analyses, but, they have not achieved any significant progress in explanation of the nexus to the extent that energy resources have gained importance in the world politics so far. These studies, in general, rest indirectly on policymakers' perceptions because data they rely on is mostly the public statements and interviews of these policymakers. These studies use basic descriptive statistics either to supplement or to negate what policymakers have said. Levi (2010) points out a lack of systematic research and comprehensive analyses about the role of energy in foreign policy. Citing expert reports or analyses do not seem to be a cure for a desire for the systematic study of energy politics (Lee, 2017). Therefore, scholarly systemic analysis of

energy politics with a valid and reliable energy interdependence measures would contribute to IR literature greatly. This thesis, to the best of my knowledge, would be the first to approach this issue in the desired way.

3.2.Importance of Energy as a Traded Commodity

Energy market, today, constitutes more than half of commodities in global trade (Smith, 2015). Energy resources differ from other tradable commodities in terms of their economic and political importance. Economically, energy is arguably the most important factor in consumption and production patterns. Politically, apart from taxation, energy appears as an important source of income to be canalized into economic investments—which may help increase economic growth, and thus, gives credit to the incumbent—and security operations—which enables states to enhance their military might. Therefore, the importance of energy resources is easy to conceive of without having known any detailed implications.

Energy resources have been one of the vital components of the power structures of countries which inevitably affects power distributions in the international system (Casier, 2011). Admittedly, being endowed with rich natural resources, like oil and natural gas, might enable states to take advantage of having such lucrative commodities without having to invest so much in other sectors. In the current era, energy influences almost every aspect of both consumption and production dynamics, and its relationship with technology is getting harder to break. Therefore, the politics of energy resources (i.e., their control, trade, transportation, and prices) has gained utmost importance for states. In a highly interdependent world, national security pertains more to than only issues related to the military (Keohane & Nye, 1977). Accordingly, foreign policy agendas have expanded and become more diverse, and energy-related issues come to gain prominence. As Kissinger points in one of his speeches:

> "Progress in dealing with the traditional agenda is no longer enough. A new and unprecedented kind of issue has emerged. The problems of energy, resources, environment, population, the uses of space and the seas now rank with questions of military security, ideology and territorial rivalry which has traditionally made up the diplomatic agenda" (1975, quoted from Keohane & Nye (1977, pp. 22)).

Apart from its role in power functions of the state, energy is also influential in domestic politics. On the one hand, governments of energy-dependent countries are on a

knife-edge regarding unexpected disruption of energy supply or price hikes which might deteriorate their position on the eyes of electorates. Having been cognizant of its ability to stimulate such a turmoil, a supplier country may use energy resources as a foreign policy instrument, namely energy weapon, to influence domestic politics of importer countries and reach its foreign policy goals. Therefore, Wenger remarks that energy policy has become an integral part of the foreign and security policies of both exporter and importer countries (Wenger, 2009).[7]

On the other hand, those in energy supplier countries might want to control this very lucrative sector to take advantages out of it (e.g. regular appointments to Gazprom's board by Federal Security Service (FSB) in Russia) (Stratfor, 2015).[8] Since the aim of a political leader is to maximize her stay in office, a supplier state need revenues yielded from energy imports to be used to please her winning coalition, as well as a broad portion of her selectorats (Bueno de Mesquita, Morrow, Siverson, & Smith, 1999). Besides consolidating its position in domestic politics through holding economic power, governments could also take advantage of such valuable public assets in order to have room for fiscal autonomy, which in turn might encourage them to pursue more aggressive foreign policies (McDonald, 2007). Therefore, the effects of energy on both foreign and domestic politics are intertwined.

As energy resources have become an essential part of domestic and foreign politics, as well as security issues, "states now desire energy security in the same sense that they desire military or economic security" (Hadfield, 2012, pp. 323), especially consumer countries. Energy security, as an important objective of consumer countries, is "to assure adequate, reliable supplies of energy at reasonable prices, and in ways that do not jeopardize major national values and objectives" (Yergin, 1988, pp. 111). Such conventional views on energy politics rest on the arguments related to resource dependence and national security implications of this dependence (Hughes & Lipscy, 2013). In the demand side, energy is an important input for both economic and military power of states. In the supply side, distribution of energy resources is not even across the world; energy is both supply- and resource-constrained commodity (Aleklett et al., 2010).

[7] Energy not only stimulates countries to secure their energy supplies but also incites them to establish regulatory institutions expected to underpin securing efforts. For example, the oil crisis in 1973 led to the establishment of the Department of Energy in the U.S. and the International Energy Agency.

[8] "A Russian Intelligence Agency Expands Its Reach," *Stratfor*. April 8, 2015.

Leaning particularly on oil, early studies frame energy as a national security issue (Brunner, 1930; Kenny, 1928). This framing, in fact, underlies the realist arguments that national security interests prevail in energy politics. Morgenthau (1963, pp. 115), for instance, depicts control over natural resources as the main component of national power. Gilpin (1981) maintains that competition over resources is a prominent factor affecting states' behavior. Focusing on interests in world politics, Krasner (1978) argues that states' policy preferences in resource markets are conditional on their idiosyncratic calculations of national security concerns with respect to dependence.

In fact, most of these arguments condition security-related concerns to the relative importance of a traded commodity for a country. The function of importance for a given commodity also depends on the level of its substitutability and the chance of diversification among suppliers (Russett, 1984). The notorious oil crisis in 1973—as a result of an oil embargo implemented by Arab countries against the West—conspicuously shows the extent to which energy demand is inelastic to supplier countries, particularly in the short-run.[9]

This disadvantaged position of energy importers may also be manipulated by the exporters. Countries endowed with high levels of natural resources (which is random we might assume) could take advantage of it. They can simultaneously use export income without exerting any burden on its citizens and control energy trade as a source of political coercion (Harsem & Claes, 2013). Therefore, geopolitical perspective sees energy resources as a valuable asset to leverage influence over other actors, and thus, to change the balance of power in international politics. For example; Mueller (2007) argues that deliberately increasing role of Russia in supplying energy to both Europe and East Asia makes Russia again an influential actor in global politics. Admitting the role of energy in international politics in this era becomes inevitable for states. As Kalicki & Goldwyn (2005) remark, actors of international politics

> "[...] must evolve from a more traditional foreign policy view, preoccupied with military security issues and relatively disconnected from the world of resource and economic forces, to a more modern view that addresses

[9] Note, however, that in the long-run the elasticity of energy demand to suppliers may change if consumer countries could take measures against the vulnerability caused by being highly dependent upon specific resources expected to come from specific suppliers. Diverting focus towards the extraction of national reserves, reducing demand in fossil fuels through energy transition policies, and increasing efficiency thanks to technological breakthrough may be conducive to having more elastic energy demand. Therefore, the weight of energy in national security policies could change in the long-run.

> economic and political factors and recognizes that world events are determined far more by the flow of resources" (2005, pp. 14).

Analyses of interstate energy relations and their policy implications, however, have not transcended bilateral, if not regional, case analyses and recommendations (Aalto, 2008; Binhack & Tichý, 2012; Casier, 2011; Dimitrova & Dragneva, 2009; Harsem & Harald Claes, 2013). For a better assessment of interstate relations with respect to energy, we need a more systematic approach utilizing international relations theories relating the energy trade with national security (Strange, 1988).

In the context of IR, energy relations can be argued as a truly interdependent relationship. On the one hand, energy supplier might take advantage of its control over the resources, and thus the market, and want to influence its clients in compliance with their policy goals. This perspective portrays dependence of importer on a supplier and a consequent vulnerability.[10] On the other hand, the demander can also acquire "power and influence over the supplier" (Quester, 2007, pp. 445). For instance, as Daojiong (2006) asserts, despite the high-level energy needs of China, its suppliers, such as Turkmenistan and Russia, cannot afford to lose China as a customer because a deliberate disruption of energy supply to China, 'factory of the world', would bring high costs to international investors and consumers, so to the foreign economies that they belong to. As he puts forward; "China needs the world, and the world needs China."

The following subsections first, explain the term "energy security," and then unfolds the debate of interdependence in energy trade, which will help us easily epitomize aforementioned terms—vulnerability and asymmetric interdependence—specifically in energy relations. In the light of energy politics and interdependence literature, we can also describe energy trade as a sui-generis type of interdependence. Out of the intersection of these two kinds of literature, I will elicit my hypotheses to be tested in empirical chapters.

3.3.Energy Security

[10] Recent scholarly articles studying energy policies indicate that the term 'energy dependence' has become to be used closely with another term, 'security threat'. As a result, some countries seek to achieve 'energy independence' to a certain extent and put in motion new policies to promote self-sufficiency in terms of energy (Casier, 2011, pp. 540).

Energy as a composition of territorialized resources can be counted as a strategic national asset which helps privileged states increase their revenues disproportionately and attain their desired levels of development, both economically and militarily, relative to other states devoid of energy resources. Therefore, not only does it influence the political and economic tracks of states, but it also changes the balance of power at the systemic level. As a source of internal development and external influence, energy, for both 'haves' and 'have-nots', is a highly salient issue for policymakers who rank energy security at the same level as military and economic security.

In energy politics literature, most of the arguments have revolved around the concept of energy security. Scholars presume that assuring energy security, in various aspects, is states' utmost objective. Whether you are a seller or buyer in the energy market may affect the meaning you attribute to energy security. In general terms, energy security can be defined as "assurance of the ability to access the energy resources required for the continued development of national power [...] and adequate infrastructure to deliver these supplies to market" (Kalicki & Goldwyn, 2005, pp. 9). Therefore, energy security primarily means the security of supply for importers and security of demand for exporters.[11]

To be concise, energy security is to have "adequate, reliable supplies of energy at reasonable prices and in ways that do not jeopardize major national values and objectives" (Yergin, 1988, pp. 111). To refine, energy security has three main components: (i) reliability, (ii) affordability, and becoming increasingly important in recent decades, (iii) environmental friendliness (Shaffer, 2009). In recognition that the relationship between energy and security is a real-world phenomenon, this relationship appears to be more complex than one can imagine. Recalling Nance & Boettcher's (2017) analogy, the relationship between energy and security is "more akin to quantum logic, where one object (i.e. policy) can have multiple states (effects) simultaneously" (2017, pp. 4). For instance, think about the utilization of nuclear energy. Having a nuclear technology evokes not only a deterrence in international politics but also prevention of proliferation and environmental danger.

[11] As Skinner (2006) suggests the term 'security of supply' contains both hard and soft meanings. In addition to material exchange with a predetermined price, it has a psychological aspect. A country could entirely be dependent on foreign resources but feel secure, whereas another one could feel vulnerable although it is partly dependent on imports. Feeling of vulnerability might vary over time with respect to political relationships. The rhetoric and signals from leaders of trade partners and the way the media reflects them may affect the intensity of those feelings.

3.4.Energy as a Type of (Inter)dependence

On conceptual elaboration of interdependence, Keohane and Nye's canonical work is one of the first research endeavors. Keohane & Nye (1977) define interdependence as a situation when 'there are reciprocal (although not necessarily symmetrical) costly effects of the transaction between parties. This transactional relationship, Keohane and Nye argue, is built on two distinct dimensions—sensitivity and vulnerability. While "sensitivity shows degrees of responsiveness within a policy framework—how quickly do changes in one country bring costly changes in another, and how great are the costly effects?" (1977, pp. 32)—, vulnerability depends on costs as a function of both changes and the availability of alternatives: "vulnerability can be defined as an actor's liability to suffer costs imposed by external events even after policies have been altered" (1977, pp. 33). Economic ties in an interdependent relationship feature costly aspects to switch partners; otherwise, the relationship would become an interconnected one. To differentiate interdependence from interconnectedness, they state:

> "A country that imports all of its oil are likely to be more dependent on the continuing flow of petroleum than a country importing furs, jewelry, and perfume (even of equivalent monetary value) will be on uninterrupted access to these luxury goods. Where there are reciprocal (although not necessarily symmetrical) costly effects of transactions, there is interdependence. Where interactions do not have significant costly effects, there is simply interconnectedness" (Keohane & Nye, 1977, pp. 9).

This study is not seminal just for the conceptual elaboration, but for the illustration of the dimensions—sensitivity and vulnerability—that a relationship should have to be identified as an interdependent relationship. According to Keohane and Nye, an interdependent relationship should be evaluated based on the extent to which it reflects both dimensions at the same time. Using the term interdependence to refer only to sensitivity, as some economists do, may lead to neglect some important political aspects of it. The critical question to be asked is: "If more alternatives were available, and new and very different policies were possible, what would be the costs of adjusting to the outside change?" (Keohane & Nye, 1977, pp. 11), which corresponds literally to a vulnerability dimension.

In fact, energy inherently combines vulnerability and sensitivity aspects of interdependence. Moreover, disproportional distribution of resources across the world makes

energy even more strategic. In energy trade, states do care not only the amount of their resource needs to be imported, but also alternative ways or suppliers to meet their needs in consideration of potential costs (i.e. cost of switching suppliers and/or resources). For instance, suppose two countries need the same proportion of natural gas import to fulfill their domestic demand. If one of these two states could diversify its natural gas needs by easily altering supplier or shifting to domestic production in a less costly way, and if the other state has no option but the usual supplier in order to fulfill domestic gas demand, then the latter would be more vulnerable than the former, although they both seem equally sensitive to price changes.

For instance, sensitivity in energy trade corresponds to the mutual effects of any change in the interdependent relationship, such as disruption of supply. While the importer may suffer from the energy shortage, the exporter may sacrifice from a certain portion income. For instance, oil trade accounts for 64% of government revenue, 24.5% of GDP, and 80% of total exports in Saudi Arabia (Alkhateeb, Sultan, & Mahmood, 2017). We observe similar figures in Russia, even after highly depreciated ruble and remarkably low oil prices: 40% of federal revenue and 12% of GDP was produced by oil and gas sector. Vulnerability, on the contrary, does not care only about the changes and their impacts; its main concern is the adaptation, or opportunity, cost—to what extent and at what costs the interdependent parties adjust these unanticipated changes. For instance, Turkey has launched two nuclear power plants projects to increase its inland energy production in the face of significant energy dependence (75% inland consumption was compensated from abroad), one of which, Akkuyu Power Plant Project, has recently been finalized and signed with Russia, as a contractor. The cost of construction is estimated to be $20 billion, which will be expended by Russian companies, and the first reactor is expected to become operational, if everything goes smoothly, in 2023. After being fully operational in 2026, this power plant is expected to provide 8% of Tukey's energy needs. In exchange for Russian know-how and financial support, Turkey has promised a guarantee of purchase—12.35 cents for each kWh produced by the power plant, regardless of the price in the spot market. Therefore, the opportunity cost consists of both temporal and financial aspects.

From the importer perspective, to compensate the amount of resource expected to come from the exporter, the importer might (i) increase its inland production—which

requires exploration of new fields or further investment over the existing establishments—, (ii) diversify its energy imports—which needs new transit routes, bilateral negotiations, and agreements—, or (iii) take measures to increase efficiency and/or reduce consumption—which, again, entails further temporal and financial investments (Pirani, 2009, pp. 108-109). From the exporter perspective, the exporter should compensate its revenue loss by establishing new trade agreements and routes both of which require considerable time and material investment (Stern, Yafimava, & Pirani, 2009, pp. 57).

As should be clear, ability to diversity needs in the short-run and willingness to bear the potential cost—political, economic, and social—due to shifts in provision patterns are the key components determining the level of vulnerability. Ongoing projects on nuclear energy plants in Turkey exemplify the typical efforts made by the government aiming to reduce its vulnerability regarding potential energy needs. Besides states' ability, their willingness is the key determinant here.

Since the significance of energy resources, as a foreign policy instrument, may rise to the extent that consumer countries need them, producer countries inherently desire to take advantage of this need and use energy as a weapon in order to influence or change foreign policy behaviors of consumers countries in favor of their goals (Stegen, 2011). The most notorious case exemplifying the usage of energy resources as an instrument to achieve a foreign policy objective is OAPEC's (Organization of Arab Petroleum Exporting Countries) oil embargo against countries supporting the establishment of a Jewish state in Palestine in 1973. The aim of sanctioning countries spearheaded by Saudi Arabia was to deter the West from supporting Israel. A similar embargo of oil forced the apartheid regime in South Africa to reorient its energy mix in the 1980s at a great cost (William & Lowenber, 1992). Deriving lessons from past experience, the U.S. opposed the construction of the natural gas pipeline from the U.S.S.R. to West Germany and asserted that the U.S.S.R. could manipulate this relationship to expand its political clout. In fact, the U.S. was partially right about its suspicions because starting from the early 1990s energy export have been designated as a tool by the Kremlin to attain political goals in its 'near abroad' (Stone, 2010). Statement of the former U.S. Vice President Dick Cheney's statement in 2006 was important to confirm how the U.S., as the main rival of Russia during the Cold War, perceives Russian endeavor to construct energy relationships around its geopolitical zone. According to Cheney, Russian

energy resources “become tools of intimidation or blackmail, wither by supply manipulation or attempts to monopolize transportation” (Meyers, 2006)

Relying on a foreign supplier, even if it is an ally, has been conceived as a source of vulnerability (Nance & Boettcher, 2012). Energy trade between the U.S. and Canada aftermath of the oil crisis of 1973 is a clear example of how states’ vulnerability aggravates relationship between allied countries in an interdependent relationship. Canada has the third-largest oil reserves after Saudi Arabia and Venezuela and energy trade is the largest component of the trading relationship between the U.S. and Canada. For many decades, the U.S. has been the only market for Canada’s natural gas and oil exports. Canada, in 1974, changed the dynamics of North American energy trade: it started to charge OPEC-level prices to American consumers and announced to phase out oil exports to the United States. This unfriendly action could have normally been reciprocated by the U.S. in ordinary times, but this time the U.S. acquiesced. Although a number of American legislators proposed to retaliate Canada by levying tariffs or taxes in the broader trade area, these proposals were not put in motion. The partial explanation of such a conforming behavior by the U.S. is that Canada was less vulnerable; it was mostly self-sufficient in oil (Keohane & Nye, 1977; Nemeth, 2007).

Therefore, since energy resources are integral parts of economic prosperity and military security, states are cognizant of the significance of energy as a foreign policy issue (Hadfield, 2012). Likewise, Wegner (2009) says that participants in an energy relationship “can no longer separate their energy policies from their foreign and security policies” (2009, pp. 226). Although energy is one of the key inputs of foreign policy, it has not yet analyzed systematically, but rather sporadically. The lack of systematic analyses leads some scholars to think that energy is not yet a structural factor affecting states' decision-making processes. For instance, according to Hadfield (2012), energy, as a foreign policy issue of both importer and exporter states, does not 'dominate' to the extent that it ‘dictates’, but she acknowledges that energy emerges as a new form of vulnerability.

While some scholars discuss energy relations around the concept of energy security, others prefer to place energy within a more general theoretical framework of IR. In the end, however, both streams of scholarly endeavor agree on the dimension of vulnerability and the

resulting harm that energy relations may inflict to a consumer country. Note, however, that energy trade, if it exists, is indispensable for both consumer and supplier countries. For a supplier country, energy trade is a source of huge income, and more importantly, this income can be obtained without damaging existing economic conditions in a society. For a consumer country, energy trade (or supply) is relatively more salient and associates with reasonably more critical issues, such as production, economic growth, social welfare, and national security. To decide which side might become more vulnerable in case of a disruption—or the type of a relationship—in energy trade needs a clarification.

As Lee (2017) indicates, measuring the degree of interdependence along a spatial plane with two endpoints—symmetrical or asymmetrical—is extremely difficult, particularly for measurements of political and psychological aspects of vulnerability (Baldwin, 1980; Mansfield & Pollins, 2001). Studies on energy interdependence so far have mainly relied on experts' opinions to mark whether a relationship should be classified as symmetrical or asymmetrical (Ebel, 2009; Yafimava, 2011). Any factor can change the vulnerability dimension of energy interdependence, such as changes in transit routes, the discovery of new resource fields, domestic energy demand, or energy storage capacities of importer states. All these changes, however, cannot occur in the short term. Therefore, factors affecting the types of relationship in energy trade can be listed as (Shaffer, 2009):

i. symmetry in the level of dependence to a supplier and a consumer (i.e. the market size at stake),
ii. availability of alternatives for both supplier (as market options) and consumer (as supplier options),
iii. the expense and expertise in transporting infrastructure.

Unless the supplier state is the only (or major) option to for each fuel source, energy consumers could change their source of need in the long term because the dependence of an exporter country to export revenue is an important factor. Particularly for gas exports, the impossibility of redirection of pipelines in the short-term renders the revenue stream of exporter countries quite fragile. In addition, in most cases, the financing of these gas pipelines is based on future revenues to be obtained from the export of gas. Therefore, the supplier should also consider not losing its market, especially in the long term. Correspondingly, this

situation may produce a rather interdependent relationship between the importer and exporter, which, in turn, creates an opportunity for the importer to become less vulnerable to political and economic ebbs and tides in the long term. This opportunity, however, does not cure the short-term vulnerability of the importer state.

Vulnerability in short- or long-term, namely temporal explanation, is critical to distinguish the degree to which consumer and supplier countries susceptible to a vulnerability in energy trade. This type of explanations rests mainly on differences in temporal concerns of participant states within a dyad and how these temporal concerns interact with potential costs to be inflicted by a trading partner, which, in fact, shapes the pattern of interdependence. In the short term, for example, the cost of interruption in energy supply is more detrimental than the cost of not getting paid in exchange for energy supply. In the long term, however, this pattern may change the other way around (Shaffer, 2009). Therefore, the significance of short-term goals of states could leave them in a more vulnerable situation regardless of how important their market to the supplier. This difference is also the reason for why energy resources lead to an inherent asymmetric relationship between a supplier and consumer countries. What Müller (2007) says while describing the asymmetry in the relationship between Germany and Russia illustrate this aspect well:

> "The asymmetry of dependency can be seen in the fact that temporary delivery interruption could have catastrophic economic and social consequences for the consumer, while a temporary refusal by the consumer to pay for deliveries would not have the same impact on the supplier" (quotations obtained from Shaffer (2009, pp. 39)).

Lee (2017) extends the expectation of these arguments and contends that in the long run, the lack of gas would become much more devastating than the loss of revenue, and thus, the possible adverse effect of energy trade disruption on importer country would become more severe than that on exporter country.

The magnitude of detrimental effects due to energy disruption may change with respect to the type of energy resources. According to Cameron (2007), natural gas is not substitutable in the short run due to the fact that both citizens in their daily life and industry in their production systems use gas only. Therefore, the European gas consumers, for instance, are relatively more dependent on Russia. In a similar vein, Harsem & Claes (2013) well illustrate the vulnerability of certain European states in January 2009, when Russia

temporarily shut down gas supply to Ukraine. Therefore, the relationship between Russia and Europe is an example of asymmetric interdependence

Relying on this explanation, I simply presume hereafter that in a relationship of energy interdependence the consumer side is more susceptible to the risk of being vulnerable in case of disruption, compared to its supplier. This presumption might be a strong one; however, the unit of analyses in my empirical investigations is on yearly basis, and thus, compatible with the notion that the short-term impact of energy trade disruption would be more detrimental for the consumer than the supplier. As should be clear, were energy to use as a weapon, the supplier would be the one that reaps benefits out of the relationship in the short-term.

3.5.Energy Weapon Model

Energy trade includes both sensitivity and vulnerability dimensions of interdependence (Andres & Kofman, 2011, pp. 5). As the energy market gets tighter and political instability in energy-producing countries persists, global concerns about energy availability have become arisen in recent years (Yergin, 2006). Intensive concerns combined with the vulnerability of energy-dependent countries to political manipulations of energy exporters elicited the question that "Can energy be wielded as a foreign policy weapon?"

According to Hill (2003), the instrument to be used in foreign policy is composed of available resources, capabilities, and changing levels of power and influence. How states rank these instruments on a spectrum, called 'continuum of power', while resorting to them is contingent on conjuncture. Trade can appear in a variety of points on this spectrum as a tool of leverage in bargaining table, sanction or coercion towards dependent partners. Hirschman's (1945) example of Nazi German clearly indicates trade as a tool of foreign policy: to increase its political clout over relatively smaller Eastern and Southern European countries, Germany involved in trade relationships with countries in these regions. The aim was to gain political leverage which would possibly be used to serve its foreign policy goals.

Armstrong (1981) frames Hirschman's expectations in a more systematic way and claims that under only some specific circumstances trade dependence may yield political influence. Basically, he designates his arguments around the assumption that the cost of the

punishment must exceed the cost of compliance for a handicapped state. Particularly, three conditions must be met:

i. A considerable part of a state's resource/investment/infrastructure should be under the control of another state.
ii. A resource-dependent state should be unable to find other sources of supply (limited possibility of diversification).
iii. The traded commodity should be vital to a country, and disruption in its supply should jeopardize positions of decision makers in recipient countries (the relative importance of the traded commodity).

Inspiring from the conditions of Armstrong, Stegen's (2011) comes up with an energy weapon model. As he argues, four consecutive conditions must be satisfied before claiming a state as a user of the energy weapon:

i. the state must consolidate the country's energy resources,
ii. the state must hold sway on transit routes,
iii. the state must use its energy resource as a carrot or stick (i.e. threats, disruptions, and price changes) in compliance with its political interests and objectives,
iv. the reaction should be observed from the dependent state to threats, disruptions, and price changes.[12]

The significance of energy for a dependent state largely stems from the potential economic and political vulnerabilities against supplier countries (Le Billon, 2004), because energy is one of the important inputs for both prosperity and security. Moreover, the expense and need of expertise to build supply infrastructures, particularly for oil and gas, plays an important role to aggravate the level of vulnerability induced by the dependence on energy resources. Shaffer indicates that "states rarely possess multiple infrastructures" (2009, pp. 38). As Skinner writes:

> "The global energy supply is a vast, inertia-ridden complex of large, fixed assets that take years to plan, sanction and construct, and they tend to be in place for a decade. The long-term business must operate within a political

[12] Stegen also adds this condition to relax the assumption that threats or the implementation of an energy weapon equate with target state acquiescence. He, in fact, shows the fallacy of this assumption.

> context manifestly driven by short-term concerns and developments. Government policies affect energy supply and demand, but not quickly as politicians might like" (Skinner, 2006, pp. 2–3).

Making substantial shifts in supply options is far more difficult when trading commodities are energy resources; energy resources are not fungible, and this prevails in every segment of the economy—both consumption and production. While some power plants must operate with coal to produce electricity, others use natural gas. In the short-term, electricity production capacities could be pegged by increasing production capacities of plants using coal or oil relative to those operating with natural gas. However, the ability to substitute energy is quite limited; states must eventually use one source or the other.

Moreover, from an environmental perspective, to turn away from natural gas in order for heating may cause unimaginably high levels of air pollution, especially in metropolitan areas. For that reason, newly built apartments get to become incompatible with traditional heating systems, such as stoves.

Therefore, vulnerability stemming from a possible disruption of energy resources has more adverse effects for a consumer country than a supplier one. Combining with the fact that as about 80% of the world's resources belong to state-owned oil and gas companies[13] (Orttung, Perovic, & Wenger, 2009), supplier countries seem to have a quite powerful foreign policy tool to wield over consumer countries. Conceptually, energy weapon is a tool for a state using its energy resources as a leverage in a negotiation table or a threat, to compel or deter other states to do—or not to do—something in the short term. As Allison, Light, & White (2006) argue, given the likelihood of diversification is low, energy supplier country might be relatively freer to act regarding its own national interest. Although some scholars are skeptic about the power of supplier country to effectively change policies in recipient countries, they agree with an argument that energy supply can be used as a preventive tool—Harsem & Claes (2013) called it a gas-for-silence strategy. Some argue that Russia uses bilateral trade negotiations as a way to silence European leaders on controversial political issues (Hughes, 2006). For instance, Schroeder (former Chancellor in Germany) hesitated to publicly criticize Russia's belligerent policy against Chechens due to the fact that the new

[13] As anecdotal evidence, while Gazprom can purchase EU-based companies, Russian law does not allow to such a foreign purchase (Aalto, 2008; Light, 2008).

north stream pipeline was being designated to ensure German supply of gas directly from Russia (Aalto, 2008).

The influence of energy exporting countries does not remain limited to importers; it extends to transit countries also. Controlling transit routes may set the stage for a number of justifications, such as bad weather, sabotage, or technical problems, to circumvent international pressures resulting from politically-motivated disruptions. The timing of disruption and the outcomes following from it, however, might be sole inputs conducive to inference about whether all these justifications are pretext, or not. One of the striking incidents exemplifying such a way of exerting influence is the explosion at the Russia-Turkmenistan gas pipeline in April 2009 which was alleged as a deliberate action of Russia. The incident has been discussed in the context of ongoing conflict over pricing and amounts to be transited between two countries (Olcott, 2013). At the backdrop of this explosion is the decreasing Russian interest in Turkmen gas resulting from low gas prices in Europe and the corresponding demand of Russia from Turkmenistan—which is rejected— to either reduce the gas transition or the price.

Such a supplier-oriented approach in using energy as a weapon, however, mistakenly ignores the possibility of change in other states' behavior in the long run as a result of encountering such an unfavorable situation. Note that any deceit or coercion towards importer state from the exporter deteriorates the reputation of the exporter and influences the terms and choice of future contracts. The reputation for being a reliable supplier is an important factor that an exporter country should consider. The irretrievably lost market share of OPEC from the 1973 oil embargo onwards exemplifies the danger of losing reputation in the long-term (van de Graaf & Colgan, 2017).

3.6.Russia–Ukraine Energy Relations: An Example of Energy Weapon

Although it becomes more prominent after the consecutive Ukraine-Russia crises, Russia’s foreign policy based on its energy relations provides researchers an experimental environment to explain the role of energy dependence in foreign politics. Up until the 2000s, the Soviet Union, and then Russia, have needed to reap material benefits from energy trade with Western Europe, such as hard currency and advanced technology. These benefits, however, have not been limited to material benefits; Russian side has also wanted to use

energy trade as a tool to split up the U.S. and Western Europe in favor of its foreign political aims (Adamson, 1985; Kramer, 2009; Stein, 1983; Stern, 1990). The gas transit, however, was made through the pipeline network crossing Ukraine (Högselius, 2013) which would render Russia vulnerable after the demise of the Soviet Union. The control of the transit routes by Ukraine was also conducive to undermine Russian influence. throughout the 1990s. Even in 2008, 80% of Russian gas export to Europe was transited via Ukraine's pipeline system (Szeptycki, 2009).[14]

The decision of Russia to halt the flow of natural gas to Ukraine in 2006 revitalizes the importance of energy in foreign policy, and this view was substantiated with the cut-off all supplies to Europe passing through Ukrainian pipelines in 2009.[15] As Hadfield describes, this decision has a "targeted, coercive, often immediate and physical impact" towards importer countries and "is a good example of energy hard power" (2012, pp. 324). Russia is justifiably supposed to use energy as a weapon, which has been repeatedly remarked by policy-makers. As U.K. Energy Minister Ed Davey put, the G7 ministers should discuss ways to "disarm Russia's energy weapon."

Russian energy policy, for instance, has been perceived by some scholars as a kind of political revanchism against the victors of the Cold War and their supporters (Hadfield, 2012). In fact, the energy trade was planned by Russia to trump the influence over the foreign and security policies in the neighborhood to the smallest, and, also in Eurasia to the greatest extent (Smith, 2008). These profound intentions became apparent with the statements of the former economic advisor of Putin, Andrei Illarinov, who remarks the increasing tendency of the Russian state to use energy as a foreign policy weapon (Buckley, 2005). Aggressive energy policy has always been used effectively by Russia as, for instance, temporary price rises in countries tracking a foreign policy path against Russian interests (Hadfield, 2012).

In recognition that energy exporters may wield energy as a tool of manipulation, U.S. Senator Richard Lugar (2008) remarks increasing dependence of European countries on Russian energy resources, and thus, vulnerability to supply disruptions would engender "less

[14] Meanwhile, Ukraine was dependent on gas imports from Russia for roughly 70% of its supply.

[15] Compared to the crisis in 2004 and 2006, the 2009 conflict between Russia and Ukraine had pervasive impacts not only on Ukraine but also on many European countries (Westphal et al., 2014; Stulberg, 2017); as Stern et al. (2009) remark, all previous conflicts "pale into insignificance in comparison with the January 2009 events" (2009, pp. 35).

[NATO] alliance cohesion on critical foreign policy issues" in order to mollify Russia lest it should inflict energy disruptions. Likewise, some analysts consider Russia's efforts to establish energy relationships with countries in its neighborhood as a reclamation of "the geopolitical clout it had in Soviet days, it is wielding its vast energy resources, rather than missiles, to reassert itself" (Kramer, 2008).

The role of energy weapon in Russian foreign policy was admittedly expressed by President Medvedev in 2010 via an interview in which he emphasized how gas prices have eased Russian hand in the arrangement with Ukraine over the Black Sea fleet in 1992 (Interfax, 2010). Moreover, several analyses citing Putin's graduate thesis, titled "Mineral Raw Materials in the Strategy for Development of the Russian Economy," indicate that Putin firmly recommends the Russian Government to control energy resources to secure its economic prosperity and reinstate its political clout in world politics as well (Nappert, 2010; Olcott, 2004).

The energy weapon wielded by Russia has not been just limited to the turning of the valve up or down but arranging energy prices so. Several researchers note that the price levied by Gazprom may change across importer countries based on their political disposition towards Russia (Abdelal, 2004; Jaffe & Soligo, 2008). For example, Jaffe & Soligo (2008) show that while Georgia, which has a relatively more western-oriented government, paid $235 per thousand cubic meters (tcm) of gas, Russia-oriented Belarus paid $46 and Ukraine, despite notorious disputes with Russia, paid $135. Their corresponding conclusion was ‘‘the fact that prices of Russian gas are negatively correlated with the degree of pro-Western orientation of the government reinforces the belief that Russia is using its energy resources as an instrument of its foreign policy’’ (2008, pp. 33).

Changes in pricing schemes between Russia and Ukraine, even after 2009, is an informative case for us to grasp the energy weapon model. Although the pricing system was changed significantly in 2009—from a yearly bilateral negotiation to long-term contractual agreements—Russia has continued to use pricing as a medium of buying influence and allegiance. In April 2010, for instance, the existing contract was renegotiated, and Russia gave Ukraine a significant discount on the gas price in exchange for an extension of 25 years on the lease by Russia of the naval base in Crimea. When Ukraine was on the verge of signing

an association agreement with the EU in November 2013, Gazprom, according to orders of the Kremlin, offered a 33% discount on the gas price—from $402 to $268.5 per 1000 cubic meters. After the deposing of Yanukovich and the following annexation of Crimea, previous discounts were discarded in April 2014, thereby gas prices for Ukraine increased by more than 80% to $485 per 1000 cubic meters—the highest price overall in Europe (van de Graaf & Colgan, 2017).

3.7.What to Do to Decrease Vulnerability?

All these unfavorable experiences raise the following question: Can energy consumer countries develop countermeasures against energy suppliers leaning to use their resources as political weapons? In fact, the aftermath of the 1973 OPEC oil embargo—the first use of the energy weapon—they were able to develop some countermeasures, such as the establishment of the International Energy Agency (IEA). With objectives of providing coordination among oil importers and mitigating supply shocks, the creation of 90-day strategic oil reserves, and the announcements of energy plan aiming reductions in dependence to fossil fuels, the IEA was supposed to bring some regulations to the energy market. Moreover, the U.S., which incurred detrimental effects to its economy during the oil crisis, has formed a strategic alliance with Saudi Arabia in order to undermine OPEC's efficacy. Owing to these countermeasures, foreign policy maneuvers, as well as the rise of oil production in non-OPEC countries, the Middle Eastern countries have lost one of their most important trumps, may be the only one, on the bargaining table (Perovic, 2009).

Likewise, the EU has also initiated new protective measures against the usage of energy weapon by Russia, especially after the Russia-Ukraine gas crisis amid winter in 2009. To exemplify, all Member States are now required to undertake and regularly update preventive action plans as of 2012. These plans should describe potential energy security threats and propose measures to mitigate these threats as well. The prominent measures proposed in these plans include (i) diversifying gas suppliers and gas routes, (ii) investing into network infrastructure (iii) increasing the share of renewable energy in the supply side, and (iv) enhancing energy efficiency in the demand side (European Union, 2010).

Along these aims, the EU also set another agenda and initiated to build the Energy Union with the member states. One of the prominent policy areas of this union is to ensure

energy security and establish solidarity and cooperation between the member states to get the best energy deal from suppliers, namely Russia. However, the construction of the Nordstream pipeline between Germany and Russia epitomizes, again, the discrepancy between the national and supra-national interests. Polish Defence Minister Radek Sikorsky called North Stream, for instance, the 'new Molotov-Ribbentrop Pact', accusing Germany and Russia of again looking to 'carve up' Poland and the rest of central Europe between them (Krickovic, 2015).[16] Germany, along with its interests to reduce vulnerability against the possible disruption of energy flow like in 2009, wants to secure the way it reaches natural gas independently of political conflicts between Russia and post-Soviet countries.

The most doable measure to mitigate energy dependence seems to be renewables. Apart from the renewables, relying more on the spot market in energy could potentially reduce dependence on one country, namely Russia (Stegen, 2011). However, feasibility in spot market options may not be the same across all energy resources. For instance, natural gas is the most inelastic energy resource for the diversification of gas suppliers or routes. Spot market structure even in oil is more fluid than that in the natural gas (Tekin & Williams, 2011, pp. 83–84). As Bryce (2009) indicates, the modern crude oil and the oil-products market is the most global, integrated, and transparent market on the globe. As demand for oil goes up, interdependence in the oil market will increase over time. For example, in 2007, the U.S. imported oil from 90 different countries and exported oil and oil products to customers in 73 countries. Similarly, in 2005, 43% of China's total oil consumption was met from imported sources (Daojiong, 2006). The gas market is also getting increasingly interdependent as a result of the rapid growth in natural gas demand all over the world (IEA, 2009).

Despite similar trends in these two resources, geopolitically important differences exist between oil and gas. Goldthau (2008), for instance, disagrees with the argument that oil can be used as an instrument of power: "Most crude oil is traded on the global market and, unlike gas, is brought to the consumer via a variety of routes." In contrast, Harsem & Claes (2013) recall the case of Organization of the Petroleum Exporting Countries (OPEC) and argues that oil might well be an instrument of power if its export is regulated through a cartel

[16] Andrew Kramer, 'Russia Gas Pipeline Heightens East Europe's Fears', New York Times, 12 October 2009.

organization. Compared to the oil market, the gas market for states is more complicated and rigid because natural gas is mainly transferred via pipelines, so needs more investment and infrastructure compared to oil. Moreover, alternative ways of transportation, such as Liquefied Natural Gas (LNG), are quite costly. Correspondingly, we observed longer-term contractual relations between parties which are more probably multilateral due to transit countries. That's why, realist-oriented scholars overstate the foreign policy role of gas, "due to the inflexibility and rigidity of gas transportation framework and the need to establish and preserve a physical link between two countries or regions" (Luciani, 2004; Tekin & Williams, 2011, pp. 60). According to them, gas security, as a foreign policy issue, will remain effective in the future (Haghighi, 2007, pp. 32; Tekin & Williams, 2011, pp. 60).

These countermeasures undertook by the EU, however, has also been under scrutiny of the Russia side. In the case of the EU's attempt to diversify its gas imports, Russia, using Gazprom, plans to strengthen its hand by establishing joint ventures with other gas-producing countries and to monopolize gas exports. Negotiation taking place between Gazprom and Nigeria in 2009 to bring African gas to the European market is important to epitomize Russia's move against the EU's preventive actions.

As another perspective, to escape perils of being the vulnerable situation, states might extend their relationship into more symmetrical and complex form (Keohane & Nye, 1977). While symmetry makes states relieved about their mutual positions in terms of importance in a given relationship, complexity perplexes states across a number of different relationship areas. This perplexity, consequently, makes determining possible issues to gain political leverage much harder, e.g. Germany–Russia vs. Ukraine–Russia energy relations.

3.8.Dependence on Energy Income: A Different Approach

Most of the studies, spearheaded by Michael Ross and Jeff Colgan, has conceptualized energy dependence in terms of being dependent upon the income coming from energy export to a supplier country. As opposed to majority of arguments regarding relatively severe vulnerability of consumer states, vis-à-vis supplier ones, based on their energy demand (i.e. consumption) and the impacts of this vulnerability to interstate relationships, these studies have tried to account for foreign and domestic political tendencies of states based on the

extent to which their economy has been underpinned by energy export (Ross, 2001, 2004, 2006; Colgan, 2010, 2011, 2013).

The most renown perspective among these studies is "resource curse," which is, in fact, motivated by the claim that energy is a double-edged sword; ostensible advantages of energy for resource-rich countries can also turn into a curse rather than a blessing (Yergin, 1991). From a resource curse perspective, for instance, Russia's dependence on energy revenues has changed the course of Russian state: increase in corruption, autocratic tendencies, and more importantly, the likelihood of engaging in international conflict, called "petro-aggression."[17] Recent systematic analyses have also indicated that, besides oil revenues, high oil prices also embolden petro-states to act belligerently (Hendrix, 2015).

In essence, energy income provides leaders a more room for their financial maneuvers. McDonald (2007) shows that budgetary freedom provided by the control of substantial quantities of public property encourages the executive towards the discretionary use of the budget, and thus makes her more likely to initiate conflict. Revisiting a similar argument, Ross & Voeten (2016) maintain that as dependence on oil exports increases for states, they become less cooperative in the international arena. Their explanation for such a connection is that oil-exporting states feel free from the economic pressures and do not need to involve in costly commitments of international institutions as wealth extracted from natural resources liberates them. They also show that while oil exports curb cooperation, other types of exports promotes it. If a traded commodity is to promote cooperation, they indicate, then this commodity should create an interdependent situation—where demand is highly inelastic—for trading countries. Therefore, a country importing all its oil need should feel relatively more interdependent, and thus, have more tendency towards cooperation than a country just importing, say, luxury goods (Ross & Voeten, 2016).

3.9.Energy Interdependence and Interstate Relations

In the liberal approach, interdependence reduces the likelihood of conflict because as interdependent relationship extends, the opportunity cost of exit from the relationship rises. Opportunity cost approach presumes that states' utility calculations about policy changes vis-

[17] Note, however, that petro-aggression is not applicable to all energy-exporting countries, such as Kuwait, Oman, and Nigeria. Only with certain leadership conditions can resources play a role towards petro-aggression.

a-vis the other state rest on the current level of interdependence. Copeland (1996) partially negates this presumption and proposes a more dynamic approach in utility calculations—states also consider future expectations in trade. According to Copeland, the impact of interdependence is conditional on states' expectation about the continuity of trade in the future, that is, if states are highly interdependent in this period, but at the same time pessimistic about the future trading relationship, then interdependence might bring about the conflict. The strategic importance of traded commodities between these states might further deteriorate future relationship. In a similar vein, a state may also be wary of the actions of their partners to alter ongoing symmetrical relationship in their favor, which paves the way for being susceptible to their political pressures.

As opposed to the liberals, some realists have argued that interdependence induces conflict because states in an anarchic environment opt for reducing their vulnerabilities through use of force (Waltz, 1979; Mearsheimer, 1990), whereas other realists have not expected any significant impact of interdependence on conflict tendency, except under some politico-strategic circumstances (Buzan, 1984; Gilpin, 1981). The debate has concentrated on the question that whether symmetry in economic interdependence is conducive to the cordial relationship between states.

To answer that question, Barbieri (2006) analyzes symmetry in a trading relationship by distinguishing its levels. She shows that only if trading relationship contributes relatively small to overall trade revenues or economic indicators (i.e. GDP) of dyads does symmetrical interdependence decrease the likelihood of conflict. Otherwise, interdependence promotes conflict. According to Barbieri's logic, since interdependence constrains states' freedom to pursue national objective independently, this might incite national grievances further and lead to more severe forms of conflict. The absence of agreement in empirical studies trying to explain the causal link between interdependence and conflict makes this topic still relevant as “an empirical question” (Levy, 2003, pp. 129). The literature highlights the need for more refined theories about the relationship between interdependence and conflict (Crescenzi, 2003, 2005).

As a sui generis type, the role of energy interdependence in shaping interstate relations is arguable. the direction of the causal relationship between energy and cooperation

remains an empirical question. Some case studies have shown that cooperation on energy is an attainable goal even amid contentious political contexts (Meierding, 2017; Stulberg, 2017). In some other case studies, particularly on Russia and the EU relations, scholars have contended that economic interdependence in the energy sphere had not mitigated mutual disputes, but rather exacerbated them (Krickovic, 2015). Some experts, in addition, assert that even energy supply potential of a country could change other countries' behavior towards it. For example, China has been supposed to modify its behavior toward Iran because of its dependence on Iranian oil supplies (Levi, 2010).

On the contrary, Van de Graff & Colgan (2017) argue that explaining events all the way through energy-related reasons is a reductionist way, called "trap of resource-determinism." According to them, energy is not a primary cause of the conflict; but, it plays an important contextual role. Regarding the claims that energy dominance may produce belligerent actions in foreign policy, they show empirically that such a connection does not exist specifically in Russia–Ukraine relations. They, however, acknowledge the role of pricing in affecting foreign policy course of ex-Soviet states.

Likewise, covering five different cases in which Russia has attempted to manipulate consumer countries by using its energy resources, and examining the timing of manipulations and the reactions following from these manipulations, Stegen (2011) reaches inconclusive evidence. One of her tentative conclusions is that targeted countries, although they are in an unfavorable position due to threats of energy disruptions, may not bend to supplier's political will if they feel they could credibly benefit from strategic alliances.

3.9.1. The Gap in the Literature

The notion of economic interdependence relates to concepts beyond economic and financial relations. Energy interdependence between countries constitutes one of these concepts, which has gained notable importance over the last couple of decades for policy-makers. For example, in the final presidential debate for the 2016 U.S. elections, Hillary Clinton spent almost as much time talking about interstate energy relations as she did for interstate commodity trade. Despite this surging interest, most valuable studies remain as in-depth case studies, describing sophisticated process shaping events in a particular case. Systematic

studies that look at how energy shapes interstate politics generally, and how energy interdependence affects dyadic state relations specifically, are scarce.

The prominent reason for the scarcity of systematic studies is the unavailability of a reliable energy interdependence measure indicating dyadic energy relations. Scholars have yet to offer a replicable measurement, and neither have they compiled a dataset. Previous research seems to distinguish energy from other types of commodities under an overarching concept of strategically important trade by focusing on economic values of energy—particularly oil—trade, calculating ratios of these energy trade values to either total trade figures or GDP, and making analyses based on this measure of energy trade dependence—not of the energy dependence (see Chatagnier & Kavaklı, 2015).

Having relied mostly on economic values, discussions regarding energy trade and its implications on foreign policy behaviors of states have largely centered on the degree to which countries depend on energy income. Such a one-sided approach, however, may lead us to miss another important aspect in energy trade relationship—the position of energy importers vis-à-vis their suppliers. Since they cannot reap financial benefits, but incur losses, out of energy trade, and on top of that they are bound to get resources in any case from any supplier, importers are subject to ebbs and tides in energy relations at least as much as suppliers. Analyses to explore interstate implications of energy trade, therefore, must take account of the factors that importer countries consider.

Rather than using economic values of energy trade and constructing measures based on aggregate trade or economic production figures, we need to be cognizant of each country's energy needs, namely domestic consumption figures and calculate dyadic dependencies with respect to amounts obtained from a given supplier. This type of approach, to me, gives much more appropriate measurement of energy interdependence than the others having relied on economic values because (i) energy trade dependence does not correspond accurately to energy dependence (ii) energy prices are quite volatile and pricing scheme of energy trade between countries may vary largely across dyads based on mutual agreements, especially for natural gas, and (iii) we cannot distinguish between countries' specific needs of energy resources by just looking at economic trade values of energy.

Relying on economic values of energy might lead us to underestimate the actual energy dependence of a given country to a supplier. For instance, in terms of economic values imports originated from Russia constitute just 8% of Turkey's total imports. Yet, in terms of consumption figures, Russian gas accounts for 55% of Turkey's total gas imports. Volatility in energy prices, as well as the variance in pricing schemes within dyads, may also cause over or underestimation of energy dependence figures. A simple comparison of oil prices in 2008 ($140 per barrel) and 2016 ($35 per barrel) would be enough to exemplify price volatility and consequent hike or drop in energy trade dependence figures for any importer country. To illustrate variance in dyadic pricing schemes, as Jaffe & Soligo (2008) reveal, while Belarus paid $46 per thousand cubic meters (tcm) of gas to Russia, Georgia, which has one-third of Belarus's population, paid $235 at the time. Measurements resting on these economic figures are sure to mislead us while comparing energy dependencies of these two countries to Russia. More importantly, using economic values in energy trade to measure dependence could also lead us to overlook the specific energy needs of countries. Since energy resources are not fungible across operations, looking only at energy trade figures in currencies does not help us distinguish between strategically important resources—even though they all are classified under energy trade (Nance & Boettcher, 2017).

Addressing these caveats, the first and foremost contribution of this thesis is a construction of reliable and spatiotemporally extensive dyadic energy interdependence measures in both aggregate and resource-specific forms (i.e. coal, oil, natural gas, and electricity interdependence), which would, to the best of my knowledge, be the first scholarly endeavor. After resolving the prominent obstacle before systematic analyses of energy interdependence, this thesis will empirically investigate the implications of energy interdependence in interstate relations and test derived hypotheses in the light of IR and energy politics literature by employing large-N statistical techniques. Such an empirical approach towards energy interdependence–interstate relations nexus with considerably extensive quantitative energy interdependence measures—using countries' consumption figures and getting disaggregated with respect to four different types of resources—would also be a humble contribution to fill in the gap in the literature of IR and energy politics.

3.10. Appraisal and the Derived Hypotheses

In the light of both IR and energy politics literature, apart from the arguments regarding the political impacts of dependence upon energy trade income for the suppliers, the main scholarly foci have been the vulnerability dimension of interdependence and potential impacts of asymmetrical relationship within dyads. Tracing on scholarly discussions and theoretical debates regarding interdependent relationship between states and relative importance of commodities traded in such a relationship, due to significance of energy related to national economic and security concerns, I assume that energy importer countries are in more vulnerable and more dependent position in a given interdependent relationship compared to their partners receiving net income out of this relationship (Lee, 2017; Mueller, 2007; Mueller-Kraenner, 2007; Shaffer, 2009). To put differently, energy in an interdependent relationship is an inherent source of asymmetry against importer countries.

Distinguishing in kind, however, is not enough to make systematic analyses and make inferences about to what extent such an asymmetrical relationship influences interstate relationship. In other words, marking energy trade or resources as relatively more significant commodities would not help us much; systematic analyses of such an asymmetrical relationship require internally valid and reliable measure of energy dependence showing the degree to which a country is dependent upon its suppliers in terms of energy imports. This measure should also consider this country's yearly inland production and consumption levels while calculating the level of dependence. First constructing such a measure and then employing this measure in statistical large-N estimation methods, I will test several hypotheses derived out of the arguments made by IR and energy politics scholars.

The unconditional liberal hypothesis is a good place to start with: interdependence promotes peace. Owing to its significance compared to other tradable commodities and inelastic nature in demand, energy increases the opportunity cost of exiting ongoing relationship for partners, and thus, they cannot afford any disruption that might result from a dispute (Crescenzi, 2003). Therefore, an increase in mutual energy trade is expected to decrease the likelihood of conflict between countries (Russett & Oneal, 2001).

> **Hypothesis 1a:** As interstate energy interdependence increases, the likelihood of observing a conflict decreases.

Similarly, high energy interdependence within dyads may lead to a more cordial relationship, and hence, higher foreign policy affinity.

> **Hypothesis 1b:** Dyads having higher energy interdependence are expected to have higher foreign policy affinity.

On the contrary, realists have claimed the opposite, and even found empirical support to their arguments that interdependence promotes the discordant relationship between countries, which may lead to interstate conflict (Waltz, 1979).

> **Hypothesis 2a:** As interstate energy interdependence increases, the likelihood of observing a conflict also increases.

One of the prominent causal mechanisms underlying the argument is that a country having been resented due to dependence upon its supplier of the important commodity could resort to militarized actions against the supplier to mitigate or eliminate its dependent, and hence vulnerable position (Waltz, 1979). Since energy resources are appropriable, this incentive does always remain as a viable option (Dorussen, 2006). Anecdotal evidence shows this viability: Japan southward attacks against the U.S. navy in 1941 has been argued in the context that Japanese aggression resulted from economic sanctions implemented by the U.S. and Britain and the goal of the Japanese army was to secure oil transportation routes. As another one, in 1942 Operation "Blue" undertaken by Germans targeted Baku to meet the oil needs at the expense of shrinking its armed forces advancing to Moscow.

> **Hypothesis 2b:** As energy dependence of a country to its supplier increases, the likelihood that this country engages in militarized conflicts against the supplier increases.

Arguments on energy interdependence (Hadfield, 2009; Cameron, 2007; Lee, 2017) have claimed that vulnerability of one of the partners as a result of high dependence upon energy resources and supplier (i.e. asymmetric energy interdependence) may influence the dependent side in a way to comply with supplier's political wishes either implicitly or explicitly. To illustrate, in 2013 December Ukrainian President of the time, Viktor Yanukovich, rejected the EU's Eastern Partnership agreement by publicly saying that Ukraine would join the Eurasian Union spearheaded by Russia. The reason behind this

rejection and statement was the threat made by Russia of economic sanctions covering energy trade and pricing.

> **Hypothesis 3a:** As energy dependence of a country to its supplier increases, the foreign policy similarity of this country with the supplier increases.

In a similar vein, since the opportunity cost of ending the relationship for the dependent country would outweigh all other benefits stemming from ending the relationship, the dependent side could be less likely to engage in militarized conflicts with the supplier.

> **Hypothesis 3b:** As energy dependence of a country to its supplier increases, the likelihood that this country engages in militarized conflicts against the supplier decreases.

When considering alternatives conducive to mitigation in energy dependence, such as the spot-market option for the resources, scholars have argued that the feasibility of such an option is the same across resource types (Tekin & Williams, 2011; Luciani, 2004). Therefore, potential impacts of dependence may vary across resources-specific dependence measures. Due to the inflexibility and rigidity in the gas market, compared to other three resources (i.e. coal, oil, and electricity), I expect natural gas to exert a more pacifying impact on the energy-dependent country.

> **Hypothesis 3c:** As natural gas dependence of a country on its supplier increases, the likelihood that this country engages in militarized conflicts against the supplier decreases.

Energy may also be a tool of the costly signal for trading countries. Referring to Morrow (1999), by sacrificing beneficial economic relations and taking a risk of militarized dispute, a state could credibly communicate its resolve, which reduces uncertainty in a bargaining space and increases the possibility of a settlement short of war. Therefore, interdependence decreases the likelihood of escalation, if not that of initiation, by increasing the range of costly signals of resolve in a crisis.

Hypothesis 4: Given that dyads involve in a militarized dispute, as energy interdependence between dyads increases, the likelihood of observing escalation in that dispute decreases.

CHAPTER 4

4.1.Introduction: How to Measure Energy Interdependence

Keohane & Nye (1977) define interdependence as a situation when 'there are reciprocal (although not necessarily symmetrical) costly effects of the transaction between parties and they talk over two distinct dimensions that an interdependent relationship should have—sensitivity and vulnerability. While "sensitivity shows degrees of responsiveness within a policy framework—how quickly do changes in one country bring costly changes in another, and how great are the costly effects?" (pp. 32)—, vulnerability depends on costs as a function of both changes and the availability of alternatives: "vulnerability can be defined as an actor's liability to suffer costs imposed by external events even after policies have been altered" (pp. 33). To be an interdependent relationship, economic ties feature costly aspects. For instance, suppose two countries need the same proportion of natural gas import to fulfill their domestic demand. If one of these two states could diversify its natural gas needs by easily altering supplier or shifting to domestic production in a less costly way, and if the other state has no option but the usual supplier in order to fulfill domestic gas demand, then the latter would be more vulnerable than the former, although they both seem equally sensitive to price changes.

Conceptualization of interdependence, however, comprises many other implications related to vulnerability and sensitivity. Hirschman, for instance, focuses on the relative importance of a trading partner while grounding his idea of dependence: if the trade partner is indispensable for the state and the state is unable to find alternative options to substitute what it needs, then dependence exists. Lack of ability and freedom to diversify trade volumes (or concentration) among existing or prospective partners, when needed, constitutes the core of dependence for the state. Therefore, such as asymmetrical dependence caused by energy demand of more dependent side can serve as a tacit potential tool for the less dependent side in order to expand its political clout. Liberals assume that the more dependent state enjoys

more economic gains from a trade with a large state than the large state does. Hirschman, however, underscores that the more dependent side might fear of losing trade gains derived from a relationship with a more powerful partner, and thus, the more powerful side might have the leverage in a bargaining table and use this leverage to secure further concessions from its partner.

Building upon Hirschman's opinions, Keohane & Nye (1977) also explicate the potential outcomes that exist in asymmetrical interstate relations. Even though they do not explicitly refer to trade–conflict nexus, they argue that possible manipulations or coercive behaviors may result from asymmetrical relationships. The level of asymmetry is, in fact, the function of relative costliness levels for each of the trading partners in case anyone of them prefers to exit from the relationship. The costliness level of exit from a trading relationship depends on the market power of suppliers and the costs of adjustment following a would-be conflict with these suppliers and/or trade disruption. Since each commodity cannot be the same in terms of the strategic importance level, the cost of exit may vary with respect to commodity type. This fact suggests that trade relationships should be disaggregated and analyzed industry by industry (Stein, 2003).

Although the definition and dimensions are easy to conceive, measurement of interdependence is quite difficult. The prominent aspect of this difficulty is related to the lack of consensus regarding what interdependence should capture, i.e., sensitivity, vulnerability, asymmetry, or commodity types. Due to different theoretical frameworks on trade–conflict relationship and existing ambiguities within and across these frameworks, scholars have operationalized interdependence based on individual assessments. Scholarly endeavors have fallen short of accuracy in operational measures of interdependence in a way to investigate interdependence–conflict relationship, neither have they provided a consensus. Theoretical approaches using trade and interdependence as their explanatory variables of states' behavior, and vice versa, do not seem to concern much about the standardization of operational measures to the extent that they ponder about the explanation of underlying causal mechanisms.

The literature has offered so many alternative operationalizations for either economic integration or dependence, depending on research questions put forward by researchers.

Dependency theorists seem to pioneer research programs regarding these operationalizations. Hirsch (1986), for instance, reported more than sixteen different operational measures on trade dependence employed by dependency theorists up until the time. Although no major advances have been made in the operationalization of dependence from the time of Hirsch's study onwards, usage of different measurements across empirical studies makes a comparison of findings and assessment of arguments' external validity difficult (Barbieri 2002). Not having questioned the goodness of fit between the conceptualization of dependence and operational measure and prioritized their question of interest, researchers have not decided on any common operationalization of dependence. Hughes's (1971) review on three oft-used measures of dependence—Savage & Deutsch's (1960) measure based on deviations in total export/import sizes, exports-to-total exports ratio, and exports-to-GNP ratio—suggests that each of these measures is likely to produce disparate results because of fundamental differences in their settings. As Barbieri (2002) figuratively explains, the first two measures are like to divide a fixed-sized pie among partners while the last measure is to divide a growing pie. Put differently, while former measures, namely partner-dependence measures[18] (Barbieri, 1996), imply that increase in dependence to one partner would lead to the corresponding decline in dependence to all remaining partners, the latter one, namely economy-dependence measure (Barbieri, 1996), does not necessarily imply so—increased dependence on a partner might not lead to a decrease in dependence on the others.

Each of these operational measures, however, captures a piece of important information on the interstate or global trade dependence or integration. According to Barbieri (2002), interdependence measure should include both kinds of information, and consequently capture the variations resulting from changes in trading patterns with partners and in the economy as a whole. The relative importance of a trading partnership compared to other relationships as well as its significance for the economy are the factors that countries should take into account of.

[18] Preference of total trade data to calculate dependence, in fact, partially stems from practical reasons. Researchers have preferred trade statistics over GDP due to limited spatiotemporal availability of GDP data. Reliable GDP data are available only for a few countries in the pre-1950 period. National trade data, however, go back to late nineteenth century for most of the countries.

Apart from GDP- or total trade-based measures, scholars have developed new operational measures to quantify trade dependence. Polachek (1980) use, for instance, the absolute value of dyadic trade figures by controlling for GDP separately to investigate trade–conflict relationship. In his later studies with McDonald, he proposes a totally different measure—the elasticity of demand and supply to partner—in order to capture the importance of a trading relationship. In a similar vein, Blanchard & Ripsman (1994) investigate the extent to which the strategic importance of commodities traded affects trade–conflict relationship with a given partner and propose a new measure accordingly. One of the main drawbacks of such research programs is the unavailability of spatiotemporally extensive data, which undermines the external validity of their arguments. As Barbieri (2002) argues, to measure the strategic importance of a commodity traded we should incorporate information about a country's specific needs, substitutability level of these needs, and ability to diversify the sources for these needs. We should also note that the strategic importance of a given commodity may change over time and place, which requires us to collect trade data as accurate, detailed, and extensive as possible.

The following subsection provides a more technical background regarding oft-used interdependence measures, as well as unfolds the pros and cons of them in terms of the degree to which they fit the conceptualization of interdependence.

4.2.Technical Investigations of Existing Dependence Measures

Scholars studying IR and economic interdependence have offered a number of causal mechanisms underlying the relationship between trade and interstate relations (Polachek, 1980; Morrow, 1999). Expectations about states' preferences and choice across many policy options in foreign politics are based on cost-benefit calculations of decision-makers. Simply, given an interdependent relationship with a partner, decision-makers may have to decide (i) to continue ongoing trade relationship or (ii) to exit the relationship and engage in a conflict with the partner. To predict the likelihoods of each option, we need to know decision-makers' value functions for trade across their partners as well as commodities traded, which is not practically possible. This has pushed scholars to develop variables to proxy these functions ex-ante by using ex-post indicators (Mansfield & Pollins, 2003).

Starting with Hirschman (1945), the operationalization of the concept of interdependence between states has been highly controversial and disparities have emerged in measurement procedures (Hirsch, 1986). The basic motivation of Hirschman (1945), while identifying the concept and proposing a measure, is to stress vulnerability stemming from being highly dependent on a partner in satisfying needs through trade. To alleviate the problem of vulnerability states should diversify their trade among many partners, and thus, make each of their partners dispensable in case of politically unfavorable situations. More simply, states should stay away from concentration in their trade portfolios. To measure any kind of concentration, scholars across different branches of social sciences (e.g. economics, business, finance, and political science) have widely used Herfindahl-Hirschman Index (HHI). The normalized version of HHI used by Gasiorowski (1986) to calculate the export commodity concentration measure of a country vis-à-vis its partners is:

$$Partner\ Concentration_{A,y} = \frac{\sqrt{\sum_{i=1}^{N}(t/T)^2} - \sqrt{1/N}}{1 - \sqrt{1/N}}$$

where Partner Concentration is the import or export partner concentration of country A in year y; t is A's exports or imports with country i in year y; T is A's total exports or imports in year y, and i is an index ranging over the N countries used. This is the normalized HHI, which was also used to calculate.

The aim of this measurement is to capture trade vulnerability proposed by Hirschman's (1945), which can be applied either to imports or to exports. A country that trades with only a few partners may find it difficult to adjust to trade disruptions. Such a country can easily be subjected to an embargo or boycott or can be forced to give costly concessions to its principal trade partners. This measure is very sensitive to detect these kinds of changes or disruptions. Of course, this measure does not distinguish among different types of traded commodities and their levels of substitutability.

Commodity concentration, although it serves well to proxy the level of vulnerability for a given country vis-à-vis its partner, falls short of covering economic, and hence the political importance of a trade. To take account of the economic importance of the trade,

Oneal et al. (1996) propose trade dependence measure for country i trading with a partner j at time t:

$$Dependence_{ij,t} = \frac{Dyadic\ Trade_{ij,t}}{GDP_{i,t}}$$

Although Oneal et al. (1996) construct and employ a single dyadic measure of interdependence by incorporating trade dependence (i.e. economy-dependence) figures of two states in a dyad,[19] Oneal and Russett, in their subsequent studies (1997, 2003), rely on the weakest link approach proposed by Dixon (1993). Basically, they employ the dependence figure of the least dependent side in a dyad to proxy interdependence. The rationale of this operationalization is that the least dependence side is less constrained not to resort to using of force since it needs the ongoing trade less (Barbieri, 2002, pp. 56). Such an operationalization seems prima facie intuitive: it not only considers the relative importance of a trading relationship for countries' economies by using GDP-based formulation but also represents the within-dyad level of importance by picking the lower number.

In addition to criticisms regarding analytical construction of the measure,[20] this measure has been claimed to be flawed in many aspects (Barbieri, 2002). This measure, on the one hand, tries to infer dyadic interdependence based on unilateral information conveyed by a less dependent party in a dyad and discards information coming from a more dependent party. Therefore, rather than truly measuring dyadic interdependence between two states, this measure treats interdependence monadically. On the other hand, discarding information of the more dependent party leads us to neglect disparities across other possible dyads. For instance, suppose Country A and Country B are dependent on one another for 10% of their trades, while Country A depends on Country C for 10% its trade and Country C depends on Country A for 90% of its trade. Most would think that the relationship between A and B is

[19] $Interdep_{ij,t-1} = (Depend_H + Depend_L) \div (Depend_H - Depend_L + 1)$ where $Depend_H = max(Depend_{ij,t}, Depend_{ji,t})$ and $Depend_L = min(Depend_{ij,t}, Depend_{ji,t})$. Adding 1 to the denominator prevents division by 0 when the states have identical scores.

[20] For instance, Keshk et al. (2004) disagree with Oneal et al.'s (1996) operationalization. Specifically, they claim that dividing total trade figures by GDP leads researchers to discard many other factors of conflict preceded by trade ties and the size of one nation's economy. Construction of one variable using two indicators that could affect conflict function in distinct ways can confound the main effect of interest. For instance, the ratio of total trade over GDP increases as total trade increases, but also when GDP decreases. Therefore, we might wrongly conclude that increase in trade dependence lowers the likelihood of interstate conflict despite the fact that this association may also be viable between countries with smaller economies. To eliminate the potential confounding effect, we need to separate trade flows from the size of the economy.

expected to be different from that between A and C. Oneal and Russett's measure, however, treat relationship in each of these dyads identically.

Barbieri (1996) argues that to truly measure interdependence, we should consider both parties' reciprocal dependence measures and incorporate them. Using partner-dependence (i.e. trade share) measures to operationalize salience and symmetry levels within dyadic interdependence relationship, Barbieri comes up with a single dyadic measure encompassing information from both partners. The indicators used to capture dependence are based upon, though not identically, Hirschman's 1945 concentration of trade concentration index. Barbieri, first, calculates the share of trade that each state maintains with each partner to assess the relative importance of any given relationship compared to others. Trade share gauges the proportion of dyadic trade flows—both import and export flows—over total trade. For example, for a dyad ij, including the states i and j, i's trade share is calculated as follows:

$$Trade\ Share_i = \frac{Dyadic\ Trade_{ij}}{Total\ Trade_i}$$

The trade shares are used to calculate dyadic measures of salience, symmetry, and interdependence, which conform to a uniform scale that ranges from 0 to 1. Dyadic salience, calculated as a geometric mean of two states' trade shares, gauges the extent to which trade partners are reciprocally dependent upon each other in a trade relationship: high salience means the relationship is important for each partner.

$$Salience_{ij} = \sqrt{Trade\ Share_i \times Trade\ Share_j}$$

Symmetry is measured by one minus the absolute value of the difference in trade shares of parties composing the dyad. According to Barbieri, the symmetry is described as the equality in energy dependence figures between partners: higher symmetry scores indicates balanced dependence.

$$Symmetry_{ij} = 1 - \left|Trade\ Share_i - Trade\ Share_j\right|$$

Finally, a measure of interdependence is created as the interaction of two dimensions of economic linkages—salience and symmetry. Barbieri aims to assign a high value to interdependence when both the extent and balance of dependence are high. Salience, symmetry, and interdependence have a range of values between zero and one.

$$Interdependence_{ij} = Salience_{ij} \times Symmetry_{ij}$$

Although her effort to incorporate information produced by both partners is commendable, Barbieri has been criticized for relying solely on trade share (i.e. partner-dependence) measures while calculating interdependence. In other words, Barbieri's operational measure does not take into account the importance of the trading relationship for the economy, neither does it consider the substitutability aspect of a given commodity traded. As Gartzke & Li (2003) more technically explicate, two essential problems exist regarding the reliance on trade share as an only source: (i) components of the interdependence measure are collinear, (ii) trade share does not actually measure economic/political effect of trade—having high levels of trade dependence on a partner does not necessarily mean that this trade is crucial for a country or for its economy. The reason for why Hirschman uses trade share to measure interdependence, at least to emphasize vulnerability dimension of trade dependence, was the unavailability of reliable and spatiotemporally extensive GDP data at his time. According to Gartzke and Li (2003), Barbieri's trade share measure is not to gauge the relative importance of trade, but to find out relative disconnectedness of a given country from the world economy, which undermines the reliability of her measure. Put simply, a measure of trade share is not as helpful as that of trade dependence (i.e. economy-dependence) to gauge the relative importance of trade for the economy.

In contrast, Barbieri (2003) and Barbieri & Peters II (2003) counter these criticisms with the argument that either taking GDP or total trade as a denominator while measuring interdependence is not essential, but the critical point in the construction of an interdependence measure is to show the extent to which this measure incorporates relevant information provided by both sides in a dyad. Moreover, she maintains with Oneal and Russett's idea of embracing the weakest link approach to proxy trade interdependence and claims that their measure is inherently a monadic measure.

All in all, Gartzke & Li (2003) unfold possible pitfalls that might arise while employing either Oneal & Russet's (1996) or Barbieri's (1996) measure. According to them, neither measures can (i) discern effects of imports and exports, (ii) capture variation in dependence across commodities, and (iii) assess the political impact of interdependence by integrating the level of substitutability of a trade. In a similar vein, Oneal (2003) indicates

that the future of interdependence studies must gradually prioritize disaggregation of total trade, and the aim of disaggregation is to be able to identify the economic importance of the trade and commodities.

Subsequent scholarly studies have, in fact, addressed the issues raised by Oneal (2003)—directly or indirectly—so far. Crescenzi (2003) incorporates trade share measure with price elasticities of commodities imported and comes up with a new measure—exit cost. Having considered price elasticity prima facia makes exit cost measure more attractive because it leads us to think that it accounts for the significance of the commodity imported. Analytically, however, this measure does not go beyond leveraging the importance of a trade partner for an importer. We still do not infer the importance of the commodity traded for the economy as a whole. On studies contributing the disaggregation of total trade in order to distinguish the economic importance of commodities trade, Peterson & Thies (2012) calculate intra-industry trade measure by mostly relying on the formulation in Barbieri (1996) and transforming aggregate trade share measure into commodity specific trade shares. Their operational measure seems more relevant to proxy the significance of the commodities imported, albeit not corresponding perfectly to the conceptualization of interdependence. They, in fact, admit the shortcomings of this measure in capturing the true meaning of interdependence and use Oneal and Russett's (1996) weakest link approach to operationalizing interdependence in their analyses. Kleinberg, Robinson, & French (2012) and Gartzke & Westerwinter (2016) also rely on Oneal and Russett's approach while operationalizing trade dependence, but they innovatively introduce extradyadic trade concentration inspired mainly from Gasiorowski's (1986) trade concentration measure.

4.3.From Economic Interdependence to Energy Interdependence

The main motivation behind the efforts in constructing energy interdependence index is to address points indicated by Gartzke & Li (2003) and Oneal (2003)—how the economic importance of trade and commodities affect interstate relations. Energy is a critical commodity that countries cannot easily produce or replace without being endowed with. Moreover, energy is an integral part of almost all economic and military activity. In that regard, energy, as a critical good, is bound to have important implications in interdependence–interstate relations nexus.

Scholarly research on energy and interstate relations has been mainly concerned with energy security rather than energy interdependence. This focus on energy security of a country inevitably directed scholars to adopt a monadic approach—mostly from the perspective of a receiving country. With some minor differences, energy security has been defined by energy scholars and experts as the "assurance of the ability to access the energy resources required for the continued development of national power [...] and adequate infrastructure to deliver these supplies to market" (Kalicki & Goldwyn, 2005, pp. 9). Since the potential adverse effects of disruption in energy trade are expected to become more devastating for a receiving country than the supplier (Cameron, 2007; Shaffer, 2009; Lee, 2017), the definition of energy security has mostly been revolving around receiving countries' perspective. That's why Yergin (1988) defines energy security in a way to have "adequate, reliable supplies of energy at reasonable prices and in ways that do not jeopardize major national values and objectives" (1988, pp. 111).

Policymakers often relate having higher levels of energy security with energy independence—as opposed to energy dependence or interdependence. The motivations behind the reification of such a relation have rested on two main assumptions: (i) the politics of energy is a zero-sum game so that there is no room for negotiation, hence cooperation, and (ii) energy autarky can be achieved and sustained (Nance & Boettcher, 2017). Yet, as Nance and Boettcher remark:

> "[…] for nearly every state, "independence" in energy production can exist only on ledger sheets: a function of balancing total energy exports and total energy imports against total energy needs. A hypothetical state that exports as much energy in the form of natural gas and coal as it imports in oil-based energy are energy independent of the books. This ledger-sheet energy independence is significant, but energy sources are not fungible across applications. Strategically, our hypothetical "ledger-sheet energy independent" state remains dependent on other states to meet its energy needs" (Nance & Boettcher, 2017, pp. 3).

There exists a number of energy indices aiming to quantify states' performances on certain energy-related issues (Quantitative Assessment of Energy Security Working Group, 2011). Although they do not significantly differ from each other in terms of empirical goals, these indices centers literally on two phenomena: energy security and energy sustainability. To construct energy security and energy sustainability, researchers have used more or less

the same theoretical approach suggesting four main components: availability (i.e. dependence to suppliers and ability to diversifying needs), affordability (i.e. cost of imports), acceptability (i.e. environmental and industrial convenience), and efficiency. Extensive assessments, however, reveal inconsistencies across these indices stemming from discrepancies in measurement procedures, indicator choices, and weights ascribed to four components (Narula & Reddy, 2015).

Dependence to foreign resources accounts for a major portion in the concept of energy security. Due to different constructions preferred and indicators used, dependency measures also differ greatly across studies (Tekin & Williams, 2011). Many researchers, for instance, have attempted to measure the concept of energy dependence by calculating net energy imports as a share of total energy consumption (e.g. EUROSTAT). Yet, energy resources are not fungible and specific energy needs of a country from a specific supplier might be overlooked if we look at net energy imports only (Nance & Boettcher, 2017). Looking only at net energy import figures, hence, fails to capture a number of critical aspects marking energy relations between two states, such as recipient countries' vulnerability to supply disruptions in specific energy resources or unfavorable price shocks, and hence encourages proponents of energy autarky. To illustrate, Finland and Slovakia, as net importers, bought 100% of their gas needs from Russia and consume it totally in 2007. France, as another net importer, imports 80% of its gas demand and just 13% of this demand was met by Russia in 2007. Romania imported just 30% of its 2007 gas demand and only 27% of this demand was met by Russian gas. With similar gas import percentages, the gas dependence of Germany on Russia, however, reached up 55% by 2007 (Harsem & Claes, 2013; Tekin & Williams, 2011). Therefore, we need to develop indicators to differentiate dependency levels of France–Finland, and Romania–Germany to Russia.

Alternatively, we can cite other measures indicating an economic dependency on energy—GDP spending to consume/import units of energy or amounts of energy required to produce units of GDP. As suggested by some experts, however, these measures "have typically decoupled importing countries from energy consumption to a greater extent than they have done exporting economies from energy production" (Ahrend, 2005, pp. 584–609; Lucas, 2008, pp. 90; Tekin & Williams, 2011, pp. 69). For instance, although energy dependence—based on energy imports from Russia as a percentage of consumption levels—

of the EU to Russia has consistently been increasing over the years, the European Commission's Eurostat (2010) database, using economic dependency measures, reports that the dependence of the EU27 economy "fell by 12 per cent, from 193 kilograms of oil equivalent (kgoe) required to generate € 1000 of GDP in 1999 to 169 kgoe in 2007" (Tekin & Williams, 2011, pp. 69).

4.3.1. How to Measure Energy Interdependence Measure

To construct dyadic energy interdependence measure, we need, first, energy dependence figures of each country vis-à-vis its partner. The way I describe the energy dependence will not consider all of the four components of the energy security concept, but some extended version of availability. When looking at the literature, researchers seem to identify availability aspect of energy security as the ability to diversify energy imports, which is in fact, one of the main components that an ideal energy dependence measure should account for. Getting inspired from trade concentration concept, most of the studies have used the Herfindahl-Hirschman index to operationalize country-level energy import diversification (Blyth & Lefevre, 2004; Gupta, 2008; Le Coq & Paltseva, 2008, 2009; Löschel, Moslener, & Rübbelke, 2010a, 2010b). This index is calculated simply as the sum of squares of each energy supplier's market share—the more concentrated the energy market is, the higher value the index has—as well as put greater weights to bigger suppliers.

Although this concentration index proposes a good way of quantifying the possibility of diversification in the market, it conveys little information about importer countries' vulnerability to the extent that it reflects the market power of the suppliers. Put differently, this measure conveys a one-sided information in a dyadic energy relationship. An ideal measure should also account for the risk of disruption in energy trade for an importer country. Echoing Cameron (2007), Shaffer (2009), and Lee (2017), we need to consider that energy dependence measure should also reflect the short-term vulnerability in energy relations of an importer against its partner. Apart from market concentration showing the likelihood of changing supplier in case of any disruption, the measure should also include consumption figures of countries to show the degree to which they are reliant on what energy resource.

Reviewing previous diversity measures in energy studies and embracing Le Coq and Paltseva's (2009) approach, Cohen, Joutz, & Loungani (2011) adapt another measure to

proxy diversification in energy imports—country-specific index (CSI). For the concentration in suppliers for country i at time t:

$$CSI_{i,t} = \sum_{i} \left(\frac{NPI_{ji,t}}{C_{i,t}} \right)^2 \times 100$$

where $NPI_{ji,t}$ is net positive energy imports from country j to country i at time t, $C_{i,t}$ is country i's total consumption of energy. Net positive import is formulated as;

$$NPI_i = \max\{0, M_{ji,t} - X_{ij,t}\}$$

where $M_{ji,t}$ is energy imports from j to i, and $X_{ij,t}$ is energy exports from i to j (Cohen et al., 2011). They call the quotient inside parentheses import dependence. Using net positive import figures rather than the gross ones is the most critical drawback of this measure. Note also that this measure is calculated in a dyadic setting, but the final figure and the way that researchers employ this figure are monadic. Aside from these weaknesses, employing consumption innovatively at the denominator, instead of total energy imports, the authors prioritize the importance of an energy import.

Building upon import dependence component of the CSI measure, we can calculate energy dependence by using either aggregate import/export and consumption figures or disaggregated figures with respect to primary energy sources—coal, oil, natural gas, renewables and/or electricity. In a line of Oneal's (2003) recommendations about the future of interdependence measures, disaggregating with respect to sources not only enhances the precision of our measure but also helps us the separate relative importance of interdependence across different sources.

As noted earlier, energy dependence measures can be derived using the notion of import dependence. EUROSTAT, for instance, uses net energy imports as a percentage of gross inland energy consumption to describe energy dependency. The formula to measure monadic energy dependence for a country is;

$$Energy\ Dependence = \frac{Net\ Energy\ Imports}{Gross\ Inland\ Consumption}$$

Net energy imports (NEI) is defined for a given country as total energy imports minus total energy exports in calorific values. Gross inland consumption is a calculated as Indigenous

production + Imports – Exports + Stock changes. Unlike NPI, net energy imports (NEI) can take negative values for net energy exporters. Although NEI, by construction, is a continuous variable, to what extent we can use negative values while constructing dyadic interdependence measure remains questionable. Incorporating both negative and positive dependence values at the same time neither has a theoretical base nor is empirically reliable. More importantly, since energy resources are not fungible, the specific energy needs of a country from a specific supplier might be overlooked if we use net energy imports (Nance & Boettcher, 2017). Therefore, this operational measure can be modified by using gross imports in calorific values, instead of net ones, as a nominator (Stone, 2010).

Incorporating the relative importance of a resource into an interdependence measure has also been observed in other studies. Peng & Poudineh (2015), for instance, come up with an index to measure the extent to which electricity generation and natural gas usage are interdependent, and they called this measure gas-to-power interdependence index. To quantify the relative degrees of interdependency between the power and gas sectors in a country, they propose the following formula:

$$I = \left(\frac{F_{NG-to-P}}{F_S}\right) \times \left(\frac{F_{NG,C}}{F_{NG,P}}\right)$$

where I is an index for gas-to-power interdependence, $F_{NG-to-P}$ is natural gas used for power generation in million tons of oil equivalent (Mtoe), F_S is the total primary energy supply in Mtoe, $F_{NG,C}$ is natural gas consumption in Mtoe, and $F_{NG,P}$ is natural gas production in Mtoe. While the first quotient measures the relative importance of natural gas in power generation and constitutes the basis for the index, the second quotient accounts for the degree of natural gas self-sufficiency in the country which has a multiplicative effect on interdependence, as either alleviating (i.e. self-sufficient countries or net exporters) or aggravating (i.e. highly dependent countries). In my operationalization, I will not include such technical details related to transformation of energy resources from one type to another. The gist, however, is important: multiplication of relative importance and self-sufficiency to measure interdependence.

In addition to calculation of import dependence or self-sufficiency, an ideal measure of energy interdependence should account for substitutability of a given energy resource as

Crescenzi (2003) suggests and partially does while operationalizing exit cost. Crescenzi's exit cost measure is calculated as a product of trade share and price elasticity. In fact, energy sources inherently have relatively inelastic demand, at least in the short-term, due to (i) high transformation cost (temporal and financial constraints), (ii) non-fungibility, and (iii) long-term contractual agreements (Shaffer, 2009). Therefore, calculating elasticity with respect not to price but to the supplier may help us increase precision in our interdependence index.

4.4.Appraisal and the Measure for Energy Dependence

Before constructing energy interdependence measure, we should decide on the unit of analysis of a dataset that we plan to incorporate this measure, because the way we construct this measure is highly dependent on the setting of the data set: monadic, directed dyadic, or non-directed dyadic. In fact, measures constructed in compliance with dataset types are not mutually exclusive but complementary. Thus, for instance, any measure that we calculate based on monadic setting can be used to construct a dyadic measure as done by Barbieri.

Monadic measures for energy dependence use aggregate import, trade, or consumption figures, whereas directed-dyadic measures adjust calculations with respect to a trading partner. Measures for non-directed dyadic datasets require relatively meticulous design due primarily to the necessity of incorporating reciprocal positions of two states at the same time. Barbieri's attempt is unique in order that information from both sides aimed to be reflected in the measure; however, the salience component of her measure seems inapplicable to energy interdependence measure using calorific values instead of economic ones. For instance, energy supplier countries' import dependencies would inherently be zero, which consequently nullifies the contribution of the salience part to interdependence measure. Her measure of symmetry, however, can be employed to investigate the dyadic relationship with respect to the level of symmetry in an energy relation. Oneal and Russett's adaption of the weakest link approach seems intuitive although it is prone to overlook variation in dyadic relations stemming from reciprocal dependence disparities across dyads.

After reviewing the relevant literature on both the measurements of economic interdependence and energy security/dependence, a modified version of import dependence measure suggested by Cohen et al. (2011) seems a good place to start with. My energy dependence measure, differently from Cohen's et al, will use gross energy imports instead of

net ones. Using inland energy consumption figures at the denominator (i.e. import dependence), rather than total energy imports (i.e. import share), helps us capture the relative vulnerability of a given energy importer against its supplier and differentiate dependency levels of, for instance, France–Finland and Romania–Germany to Russia.

Import share, by construct, gives more of more weight to the relative importance of a trading partner for a given energy source vis-à-vis other partners, no matter if imported energy source constitutes any economic/political significance. Import dependence, however, gauges the relative importance of an imported energy source more aptly than the import share. Moreover, analytical decomposition of import dependence consists of import share:

$$D_{ij,t} = \frac{X_{ji,t}}{M_{i,t}} \times \frac{M_{i,t}}{C_{i,t}} = \frac{X_{ji,t}}{C_{i,t}}$$

where $D_{ij,t}$ is import dependence of country i to country j at time t, $C_{i,t}$ is country i's total consumption of energy—regardless of the resources—, $M_{i,t}$ is total energy imports of country i, and $X_{ji,t}$ is energy exports from j to i. While the first quotient corresponds to the import share (e.g. the percentage of Russian energy within total energy imports of Turkey) and indicates the relative importance of a supplier, the second quotient represents the degree of reliance on imports to meet energy demand in a country. Therefore, the basis of our index should be the import dependence.

Since countries' specific needs of energy resources might change and this variation could affect dependence patterns against suppliers, a further modification of the import dependence measure would be beneficial. As should be clear, interdependence measure should disaggregate import dependencies with respect to primary energy resources—coal, oil, gas, and electricity. Therefore, first, we need to calculate import dependencies based on resource types, and then, we need to weight import dependencies with another relevant indicator showing us a relative importance of a given resource for a country's energy consumption as a whole. Such a refinement in the formulation increases accuracy and explanatory power of our index. Otherwise, we cannot differentiate the extent to which a country would primarily need a given source and how this need would alleviate or aggravate corresponding source dependence. Therefore, the disaggregated and weighted version of our energy dependence measure with respect to resource types would be as follows:

$$ED_{ij,m,t} = Import\ Dependence_{ij,m,t} \times \frac{Total\ Consumption_{i,m,t}}{Gross\ Energy\ Consumption_{i,t}}$$

where $ED_{ij,m,t}$ is energy dependence of country i to country j with respect to resource type m, at time t. Import dependence measure is just a modified version of the previous formulation with respect to resource types.

$$Import\ Dependence_{ij,m,t} = \frac{Exports_{ji,m,t}}{Imports_{i,m,t}} \times \frac{Imports_{i,m,t}}{Total\ Consumption_{i,m,t}} = \frac{Exports_{ji,m,t}}{Total\ Consumption_{i,m,t}}$$

By simply summing up these measures, I can calculate the overall energy dependence of country i to country j, at time t:

$$OED_{ij,t} = \sum_{m} ED_{ij,m,t}$$

In most of my analyses, the unit of analysis will be directed-dyad–year. Since analyses of directed dyads are implicitly monadic (knowing a direction of an action enables researchers to arrange variables in order to explain unilateral behavior in a dyad), explaining the possible variation in a dependent variable (i.e. interstate relationship) with respect to the unilateral position of a country vis-à-vis its partner would be relevant.

In some of my analyses I will use non-directed dyad–year setting (now we care about not the variation in country's action, but variation within a dyad itself), and thus, I need to come up with a new measure of interdependence. The main goal of interdependence measure, as Barbieri remarks, is to reflect all relevant information conveyed by two parties as much as possible. To generate a dyadic measure of energy interdependence, I have two widely utilized alternatives—Oneal and Russett's (1997) weak-link approach or Barbieri's (1996) interdependence formulation. Both approaches use dyadic dependence figures of one state to another to generate an interdependence measure.

Oneal & Russett (1997) employ the weak-link approach and identify the lower dependence score within a dyad as an interdependence measure. The weakest link approach assumes that the less dependent side defines the conflict propensity within the dyad. As Barbieri & Peters II (2003) warn, that kind of operationalization ignores the motivation or power of the more dependent state to influence the relationship. Giving credit to their warnings, I rely on the formulation proposed by Barbieri (1996) to measure dyadic

interdependence. Using dyadic energy dependence figures, I respectively calculate dyadic measures of salience, symmetry, and interdependence, all of which conform to a uniform scale that ranges from 0 to 1. Dyadic salience, calculated as a geometric mean of two states' energy dependencies, gauges the extent to which partners are reciprocally dependent upon each other in the energy relationship: high salience means the relationship is important for each partner.

$$Salience_{ij} = \sqrt{ED_{ij,m,t} \times ED_{ji,m,t}}$$

where $ED_{ij,m,t}$ is energy dependence of country i to country j for energy resource m at year t and $ED_{ji,m,t}$ is energy dependence of country j to country i for energy resource m at year t. Symmetry is measured by one minus the absolute value of the difference in energy dependencies of parties constituting the dyad. According to Barbieri, the symmetry is described as the equality in dependence figures between partners: higher symmetry scores indicates balanced dependence.

$$Symmetry_{ij} = 1 - \left|ED_{ij,m,t} - ED_{ji,m,t}\right|$$

Finally, a measure of interdependence is created as the interaction of two dimensions of economic linkages—salience and symmetry. Barbieri aims to assign a high value to interdependence when both the extent and balance of dependence are high. Salience, symmetry, and interdependence have a range of values between zero and one.

$$Interdependence_{ij} = Salience_{ij} \times Symmetry_{ij}$$

This formulation calculates four different energy interdependence variables with respect to four primary energy resources—coal, oil, natural gas, and electricity. To generate overall energy interdependence variable, I simply use the overall energy dependence figures—as a total of four resource-dependencies—and re-calculate salience, symmetry, and interdependence measure respectively.

CHAPTER 5

5.1.Introduction: Energy Interdependence Dataset

One of the most important impacts of the behavioral revolution on the study of interstate relations has been to develop datasets that quantify various types of relations and events states have experienced with each other. Exhibiting extensive spatial and temporal variance, these datasets have looked at the incidence of militarized disputes (Ghosn, Palmer, & Bremer, 2004), types and temporal coverage of interstate alliances (Gibler & Sarkees, 2004), interstate foreign policy similarity scores (Bueno de Mesquita, 1981; Signorino & Ritter, 1999; Voeten, 2013), countries' regime types (Jaggers & Gurr, 1995), national capabilities (Singer, 1988), and interstate trade figures (Barbieri, Keshk, & Pollins, 2009). All these datasets help scholars explain international phenomena in a more systemic way.

Explaining interstate relations through economic interdependence requires systematic conceptualization as well as operationalization of interdependence. Relying primarily on international trade values in currencies reported by national agencies or international organizations, some IR scholars have compiled monadic and dyadic trade datasets (Barbieri et al., 2009; Gleditsch, 2002). More importantly, although they have used the similar datasets, scholars have constructed various dyadic interdependence measures based on their theoretical understandings of interdependence.

This thesis aims to fill a gap in the interdependence literature by focusing on a different strand of interdependence—energy interdependence. Despite its (increasing) salience in IR, no attempt has been made to develop a similar systematic dataset on how states relate to each other in terms of energy. Energy is arguably the most valuable traded commodity in the world. Unlike most other traded commodities, securing energy resources is essential for all economic and military activity, which increases the strategic importance

of these resources. States vary significantly in their energy resources and a country's energy endowment can have a big impact on its destiny. Its abundance was critical to the rise of some global powers (e.g. the U.K.) while its scarcity has led others to start wars and disappear (e.g. Imperial Japan). Given states' intense competition over energy resources, understanding when and how energy interdependence affects international politics continue to remain relevant. While scholars and policymakers have extensively debated the link between international politics and international trade in general terms, systematic analyses gauging how energy interdependence shapes interstate relations are scant. To facilitate research on this topic, this thesis introduces the Global Energy Interdependence Dataset. The dataset, presented in a monadic, dyadic and directed-dyadic format, covers the globe for the years between 1978–2012. This chapter details compilation procedures of the dataset: introduces data sources, explains synchronization procedures, enumerates problems faced and solutions developed throughout the compilation process. The main challenges in the construction of this dataset have occurred in the process of synchronization of data obtained from various sources. More specifically these challenges can be listed as:

- Standardization of codes assigned to countries
- Ensuring temporal and spatial coverage for each country and country-dyad
- Country-specific issues
- Standardization of energy figures based on gross calorific values

Reported figures and variables in the Global Energy Interdependence Dataset are based on four broad categories of energy sources, called primary energy sources—coal, oil, natural gas, and electricity. The dataset reports both monadic aggregate energy statistics and dyadic energy trade flows. Monadic aggregate energy statistics include total energy exports, imports, and consumption figures of countries per year for each of four energy sources, if available. Moreover, it has yearly global figures for exports, imports, and consumption, again, for each source. Dyadic energy trade flows correspond to annual gross energy imports of a country from a given partner, as well as a breakdown of these imports by a primary energy source. To have all these figures—at the national, global, and dyadic levels—, I have benefitted from several databases, which I will explain in order of usage below.

The dataset covers all these forms of primary energy sources traded (i.e. imported or exported) between two countries in a year. The raw data presented in varying quantity type within or across different databases are converted into a common energy unit (megajoules) for each source based on the procedures I will describe below.

In the following subsection, I will introduce the main components of energy, as well as necessary definitions of them, that I have used while contemplating the dataset. Secondly, I will explicate the sources of the dataset by pointing their spatiotemporal coverages and my criteria of preference regarding their order in usage. Thirdly, I will explain how I constructed monadic and dyadic formats of energy trade. Finally, I will provide details about the problems I have faced during this process and corresponding solutions I have offered, as well as caveats that this dataset reserves to be solved in further versions.

5.2.Necessary Information to Construct Energy Dependence Variable

Chapter 4 gives a detailed information about how to construct an energy dependence variable. To recall, the energy dependence variable is calculated as follows:

$$ED_{ij,m,t} = \frac{Exports_{ji,m,t}}{Total\ Consumption_{i,m,t}} \times \frac{Total\ Consumption_{i,m,t}}{Gross\ Energy\ Consumption_{i,t}}$$

where $ED_{ij,m,t}$ is energy dependence of country i to country j for energy resource m at yeat t. $Exports_{ji,m,t}$ denotes the exports of country i from country j for energy resource m at yeat t. While total consumption corresponds to inland consumption figures of importer country for a given energy resource, gross energy consumption gives the total inland energy consumption comprising all resources. This formulation calculates four different energy dependence variables with respect to four primary energy resources—coal, oil, natural gas, and electricity. To calculate overall energy dependence variable, I simply get the total of these four energy dependence figures. Missing values are treated as zeros if at least one of these four energy dependence figures is available.

Based on this formulation, to construct the variable I need figures of (i) dyadic energy flows, (ii) total inland consumption by each of four different primary energy resources, and (iii) total inland energy consumption. All these figures should be standardized and reported in calorific values.

5.3.Introducing the Databases

5.3.1. International Energy Agency (IEA) Database

The EIA was founded in 1974, right after the oil crisis of 1973. The founding purpose of the IEA at the time was to help countries coordinate a collective response against the possible supply crises in oil. Besides this purpose, aspects of the IEA's work have significantly evolved and expanded. The EIA analyzes the full spectrum of energy sources comprising coal, oil, natural gas, electricity, and renewable energy, as well as wide range of issues, such as energy technologies, efficiency, carbon emissions, and energy prices.

The IEA database and its annual reports are our primary source for the global-, national-, and dyadic-level energy statistics. Besides its broad range of issue coverage (e.g. carbon emissions, energy technology, energy prices, and efficiency), the IEA provides the most reliable and spatiotemporally extensive energy data—based on availability and source type, the database covers information of 145 countries from 1960 onwards. Figures for the energy trade, however, are reported at the core of OECD countries meaning that inter-state trade figures of a non-OECD country become available only if an OECD country imports from or exports to this non-OECD country. In other words, IEA does not provide figures on energy trade between two non-OECD countries. The dataset for natural gas trade is the only exception where interstate trade figures are available for 146 countries.

IEA reports several datasets for four types of primary energy resources, plus renewables, for all available years. Temporal coverage of national energy statistics (e.g. Total Imports/Exports, Consumption, Stock Changes) is from 1960 to 2015. The coverage for dyadic energy trade, however, starts from 1978. Information databases for coal, oil, natural gas, and electricity contains time series of annual resource balances for the OECD and non-OECD countries from 1960 to 2014. Statistics of country aggregates comprises data on production, total imports and exports, and gross inland consumption. Moreover, they report exports by destination and imports by origin.

The IEA database is my primary source while compiling the energy dataset because it provides the most reliable, detailed, and carefully designed data particularly for energy resources and energy-related concepts. In addition, it seems quite likely that the IEA will continue collecting such high-quality data for some time into the future.

While compiling dyadic energy trade figures, I used both exports by destination and imports by origins datasets reported by the IEA. As indicated, IEA reports coal, oil, and electricity trade data based on transactions of OECD countries (34 countries). Temporal coverage of these datasets is from 1978 onwards for coal, from 1960 onwards for oil and electricity. For natural gas, while exports data are designated at the core of OECD countries, imports data are reported for all countries having explicit trade information to be reliably reached. Temporal coverage of natural gas imports data, however, is more limited compared to exports data and is from 1991 onwards.

Coal trade data by country of destination and origin for OECD member states provides detail about coal types and products including anthracite, coking coal, other bituminous coal, sub-bituminous coal, lignite, patent fuel, coke oven coke, coal tar, brown coal briquettes (BKB), peat, peat products, hard coal, brown coal and steam coal. While exports from the OECD member countries cover 96 destinations, import data provide information from 76 origin countries to OECD countries.

Oil information on trade flows provides data on OECD member countries' imports from 104 origin countries as well as exports to 95 destinations for 22 products including crude oil, NGLs, motor gasoline, gas/diesel oil, residual fuel oil, and other refined products. Temporal coverage of flows between OECD countries starts from 1960 while those between OECD and non-OECD countries start from 1971.

The natural gas information provides yearly export data by country of destination (47 countries) for OECD member from 1960 to 2015 although data for period 1960-1970 are not available for non-OECD partners. Information disseminated for import data is spatially more comprehensive, but temporally quite limited. Yearly data for imports are from 1993 onwards covering dyadic trade between 85 countries. Electricity trade flows are, again, based on data reported by OECD countries—imports from and exports to 50 partner countries of OECD members, from 1960 to 2014.

For all source types, import and export figures comprise amounts having crossed the national territorial boundaries of the country regardless of customs clearance. Quantities of sources in transit are excluded. For coal, exports or imports comprise the amount of fuels supplied to or obtained from other countries. For oil and natural gas, quantities of crude oil

and oil products exported or imported under processing agreements (i.e. refining on account) are included. Crude oil, natural gas liquids (NGL), and natural gas are reported as coming from the country of origin; refinery feedstocks and oil products are reported as coming from the country of the last consignment. Re-exports of oil imported for processing within bonded areas are shown as an export of product from the processing country to the final destination. For electricity, if it is "wheeled" or transited through a country, the amount is shown as both an import and an export (IEA, 2017).

Energy consumption figures, terminologically named as Total primary energy supply (TPES), corresponding to use of primary energy sources before transformation to other end-use fuels, which is equal to inland production + imports – exports ± stock changes.[21]

Table 1: Products based on Four Primary Energy Resources Covered by the IEA Database

COAL		
Anthracite	Lignite	Coal tar
Coking coal	Peat	Peat product
Bituminous coal	Briquettes of lignite	Patent fuel
Sub-bituminous coal	Oven coke	
OIL		
Crude oil	Naphtha	White spirit & SBP
Natural gas liquids (NGLs)	Motor gasoline	Lubricants
Refinery feedstocks	Aviation gasoline	Bitumen
Additives/oxygenates	Gasoline type jet fuel	Paraffin waxes
Other hydrocarbons	Kerosene-type jet fuel	Petroleum coke
Refinery gas	Other kerosene	Other products
Ethane	Gas/diesel oil	
Liquefied petroleum gases (LPG)	Fuel oil	

[21] "Inland production comprises the production of primary energy, i.e. hard coal, lignite, peat, crude oil, NGLs, natural gas, biofuels and waste, nuclear, hydro, geothermal, solar and the heat from heat pumps that is extracted from the ambient environment. Production is calculated after removal of impurities (e.g. sulphur from natural gas). Imports comprise amounts having crossed the national territorial boundaries of the country whether or not customs clearance has taken place. Exports Comprise amounts having crossed the national territorial boundaries of the country whether or not customs clearance has taken place. Stock changes reflects the difference between opening stock levels on the first day of the year and closing levels on the last day of the year of stocks on national territory held by producers, importers, energy transformation industries and large consumers. A stock build is shown as a negative number, and a stock draw as a positive number" (IEA, 2017).

NATURAL GAS	
Natural gas, gaseous	Liquefied natural gas (LNG)
ELECTRICITY	
Electricity	

5.3.2. United Nations Trade Statistics Database (UN Comtrade)

The spatiotemporal limitations of the IEA necessitated the use of other datasets. To recall, IEA does not present data on non-OECD dyadic energy trade for coal, oil, and electricity, and no data for natural gas trade exists before 1991. Therefore, my secondary data source for dyadic energy trade is the United Nations Trade Statistics Database (Comtrade, 2014). UN Comtrade contains detailed interstate imports and exports statistics based on reports of statistical authorities including 254 countries. UN Comtrade is the most comprehensive trade database available more than 1 billion records of national and interstate trade figures. Besides the economic value of traded commodities between states, UN Comtrade reports types of unit and amount of commodity trade. A typical record in UN Comtrade is, for instance, the exports of oil from Iraq to Turkey in 2011 in terms of value (in US dollars), volume (in liters), and net weights (in kilograms). Based on the types of energy resources, units used to report values may change. For instance, some records of natural gas flows are reported in liters although most of them are reported in kilograms. While coal flows are reported always in kilograms, electricity flows are reported in megawatt hours (MWh). These records, however, are not always reported in such a detailed format—types of unit and amounts based on them can be missing. If I have no chance to convert these records into reliable units and values, then I simply treat them as missing.

The UN Comtrade database is continuously updated based on the reports of the national authorities, and commodity types are standardized by the UN Statistics Division based on Standard International Trade Classification (SITC). Table 2 shows the types of energy resources reported in the UN Comtrade database.

Table 2: Types of Energy Resources in the UN Comtrade Database

SITC rev. 2 (1976–1987)		**SITC rev. 3 (1988–onwards)**	
Product Code	**Product Description**	**Product Code**	**Product Description**
3221	Anthracite	3211	Anthracite
3222	Other coal	3212	Other coal
3223	Lignite	3221	Briquettes of coal
3224	Peat	32221	Lignite
3231	Briquettes of coal/peat/lignite	32222	Briquettes of lignite
3232	Coke and semi-coke	3223	Peat
333	Crude oil, non-refined petroleum	325	Coke and semi-coke
334	Petroleum products	333	Crude oil, non-refined petroleum
335	Residual petroleum products	334	Heavy petroleum products
34131	Liquefied propane and butane	335	Residual petroleum products
34139	Liquefied gaseous hydrocarbons	342	Liquid propane and butane
3414	Petroleum gases and other gaseous hydrocarbons	3431	Liquefied Natural Gas (LNG)
351	Electricity	3432	Natural Gas (Gaseous)
		344	Petroleum gases and other gaseous hydrocarbons
		351	Electricity

In the UN Comtrade database, trading relationships of two countries in a given year, if available and applicable, are recorded under four categories: Exports, Re-exports, Imports, and Re-imports. Exports of a country can be differentiated as exports of domestically produced goods and that of foreign-origin goods. The export of the latter is called re-exports. Re-exported goods are, in fact, the goods imported earlier. For instance, Turkey buys crude oil from Iraq, processes them in the refineries, and sells back certain oil products to Iraq again. Exporter country might be a place to process certain goods coming previously from a given importer. Nevertheless, export values and quantities reported by a country for a given partner include both the exports of domestic and foreign goods.

In a similar vein but in an opposite direction, re-imported goods in a given country are the goods exported previously by the same country. Exported good may return to the country of origin because (i) the good might undergo a process abroad, (ii) the good might be

defective, (iii) the importer might fail to meet certain conditions agreed before (e.g. payment or cancellation), or (iv) the authorities in the importer country might enforce quotas or barriers. Values and quantities of re-imports are, again, included in country imports.

Despite being a spatiotemporally comprehensive database, UN Comtrade has some limitations. These limitations should also be revealed before using data.

1. Values reported in detailed commodity data may not sum up to the total trade value for a given reporter or country in the dataset because countries have right to veil some of their detailed trade data due to confidentiality. This veiled trade is, however, included at the higher commodity level, and thus, in the aggregate trade value. Energy trade data which are not reported at a specific 4-digit SITC code will be included in the total trade value, at a 1-digit code.
2. Reporters (countries or areas) may not consistently make their yearly trade statistics available, and even they make they may not report it compatible with the most recent commodity classification. Therefore, for a country in specific years trade values might be missing. UN Comtrade, unlike IEA database, does not provide estimates or adjustments for missing data. Correspondingly, total trade figures of country groups or unions could be understated because of unavailable data for some countries.
3. Recorded export values from one country to another (exports from State A to State B) may not coincide with import values in reverse direction (State B's imports from State A). The difference may occur due to various reasons related to differences in valuation, quantity inclusion/exclusion of commodities, or timing. UN Comtrade does not correct these differences in valuation. While compiling my dataset, I select the highest one among the recorded trade flow values considering both directions.
4. Countries of origin indicated in a trading relationship rests on the reports of exporter countries. Importer countries may prefer to report the country of the last consignment as their origin where commodities were imported, although this reported partner is just a place for transition, not an actual country of origin. Therefore, being a partner country in imports does not necessarily mean a direct trading relationship. This discretional reporting may lead us to erroneously consider that trading relationship exists within some dyads, although no relationship exists in reality. The formulation of energy dependence variable, however, prevents miscalculations that may stem

from such unreal reporting of trade flows: even though export of any given energy resource has been reported, for instance, from Country A to Country B, if Country B does not consume any of this resource, then its dependence on Country A would be coded as zero.

5.3.3. CEDIGAZ Statistical Database

CEDIGAZ is a non-profit association aiming to provide natural gas information. CEDIGAZ's Statistical Natural Gas Database is one of the most reliable, unbiased, and accurate sources providing trade statistics of natural gas, as well as national consumption and reserve levels for more than 120 countries from 1950 onwards. To compensate for a temporal deficiency in the IEA database of natural gas, I also utilize this database. While compiling dyadic natural gas trade flow figures, as well as national consumption and trade figures, I use the CEDIGAZ database in case I do not find relevant information in the IEA database. The figures in this database are reported in a unit of billion cubic meters (bcm).

5.3.4. World Bank Databank

World Bank Databank reports yearly national energy consumption figures through the courtesy of the IEA. The IEA disseminates energy consumption estimates in consultation with national statistical offices, oil companies, electricity utilities, and national energy experts. The reason I used World Bank Databank as an auxiliary data is that the IEA does not report figures of some countries in its database, especially countries with very small populations, such as the Marshall Islands, but World Bank does. Even not to miss such data points, I used World Bank data. World Bank database reports energy consumption figures in million tons of oil equivalent (Mtoe).

5.3.5. The U.S. Energy Information Administration International Database (EIA)

The U.S. Energy Information Administration (EIA) is the statistical and analytical agency established under the U.S. Department of Energy. The EIA collects, analyzes, and reports independent and unbiased energy information. It provides a comprehensive database including a wide range of energy sources, end uses, and energy flows. It disseminates the data publicly through its website. The EIA database reports aggregate energy statistics of 228

countries for a period of 1980-2016 in multiple units (i.e. British thermal unit (btu); barrels per day (b/d); Megajoules (MJ)); however, it disseminates energy trade flows only for the U.S. and its partners. Another important deficiency in the EIA database is that national oil imports and exports information has not been reported, which limits the spatiotemporal coverage for oil statistics in our dataset.

5.3.6. Correlates of War National Material Capability Dataset

Power—defined conventionally as the ability to influence and change decisions or actions of an adversary—inherently comprises many factors one of which is nations' material capabilities. Although power cannot be described only as a function of material capabilities, to quantify it we should hinge on concrete sources. Association between material capabilities and power encourages scholars to operationalize the former in order to proxy the latter. The most widely used indicator quantifying national material capabilities is the Composite Index of National Capacity (CINC). One of the components of CINC Score is yearly Primary Energy Consumption (PEC) figures of states in metric ton coal equivalent (tce) covering the period 1816–2012. CINC Score includes PEC because the greater the energy consumption, the larger the manufacturing capacity of an economy, the better the country has an economic prospect, the more production and income this country could enjoy, and thus, the more potential clout this country could have over others. Compatible with IEA's definition of consumption, PEC refers to inland production + imports – exports ± stock changes, based on four broad energy sources—coal, oil, natural gas, and electricity. PEC data rely on two sources: the Mitchell International Historical Statistics series for the pre-1970 period, and the Energy Statistics Yearbook published by the UN for the post-1970 period.

5.4.Calculating Energy Dependence

To calculate dyadic energy dependence, the most critical figures to be used are dyadic energy trade flows, which come primarily from the IEA database. In case the IEA database fails to provide energy flow information for given dyad–years, I used UN Comtrade data as the auxiliary source. UN Comtrade standardizes commodity types based on two different coding systems: Harmonized Commodity Description and Coding Systems (HS) or Standard International Trade Classification. These two coding systems have five and four different

versions, respectively. Newer versions provide more detailed commodity specifications at the expense of losing specific temporal periods retrospectively (see Table 2). Using the SITC coding system, versions 2 and 3, I compile dyadic trade flow figures from UN Comtrade data for period 1978–2014,

I rely on the IEA and UN Comtrade databases to obtain dyadic energy trade information for primary energy sources—coal, oil, natural gas, and electricity. For natural gas, I also use the CEDIGAZ statistical database, which provides dyadic trade information on natural gas. These three are the sources that I rely on for interstate energy trade flows. For national and global aggregate trade and consumption data, I benefit from several sources. For global aggregate trade and consumption data, the IEA database offers a complete information for each of four primary sources, plus renewables, from 1971 onwards. For national aggregate trade and consumption information, the IEA database covers 146 countries, again from 1971 onwards. Since my statistical analyses will cover dyadic relations of 199 countries identified by Correlates of War project, the IEA database with 146 countries falls short of covering all the dyad–years for a period of interest. Therefore, I need national aggregate statistics for 53 more countries. To obtain this information, I utilize other databases. National energy trade data for coal and electricity come from the EIA and UN Comtrade databases. Since UN Comtrade does not provide any consumption data, the EIA database is left as the only alternative to obtain consumption figures for coal and electricity. For aggregate oil trade data, the UN Comtrade database is the only source; the EIA database has not yet disseminated aggregate oil export and import data for non-OECD countries. For oil consumption, however, the EIA database provides the only supplementary data in case the IEA database falls short of providing the data. Aggregate trade statistics for natural gas comes from the IEA, the CEDIGAZ, and UN Comtrade databases, respectively. Consumption figures are, again, available in these databases, except UN Comtrade.[22] Table 3 summarizes the availability of information in all these databases with respect to resource types and levels of analyses.

[22] BP Statistical Reviews, which provides alternative data source for information I seek, do not provide anything new over existing sources that I have relied on in terms of spatial and temporal coverage.

Table 3: Availability of Information in Databases based on Resource Types and Levels of Analysis

	IEA	UN Comtrade	CEDIGAZ	EIA	PEC	World Bank
Dyadic Trade						
Coal	+	+				
Oil	+	+				
Natural Gas	+	+	+			
Electricity	+	+				
Monadic Total Imports/Exports	+					
Coal	+	+		+		
Oil	+	+				
Natural Gas	+	+	+	+		
Electricity	+	+		+		
Monadic Total Consumption	+				+	+
Coal	+			+		
Oil	+			+		
Natural Gas	+		+	+		
Electricity	+			+		
Global Imports/Exports	+					
Coal	+					
Oil	+					
Natural Gas	+					
Electricity	+					

While merging all this information, I determine the order of preference. The figures below show my order of preference while compiling the dataset.

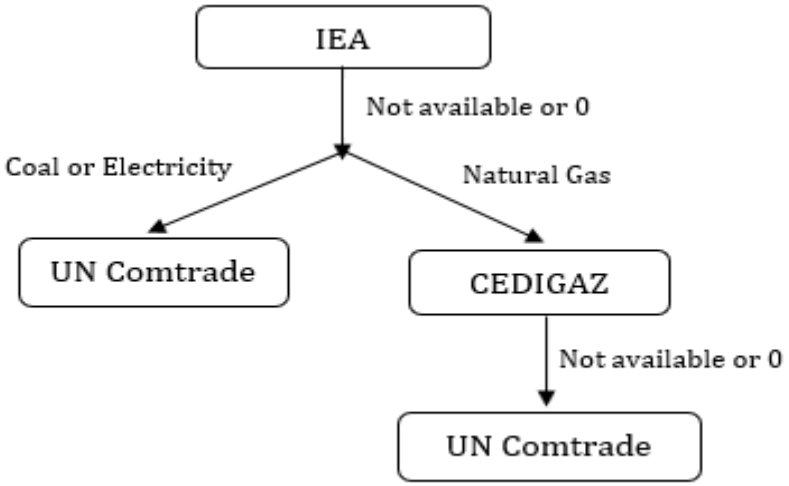

Figure 2: The Order of Preference in Compiling Dyadic Energy Flows

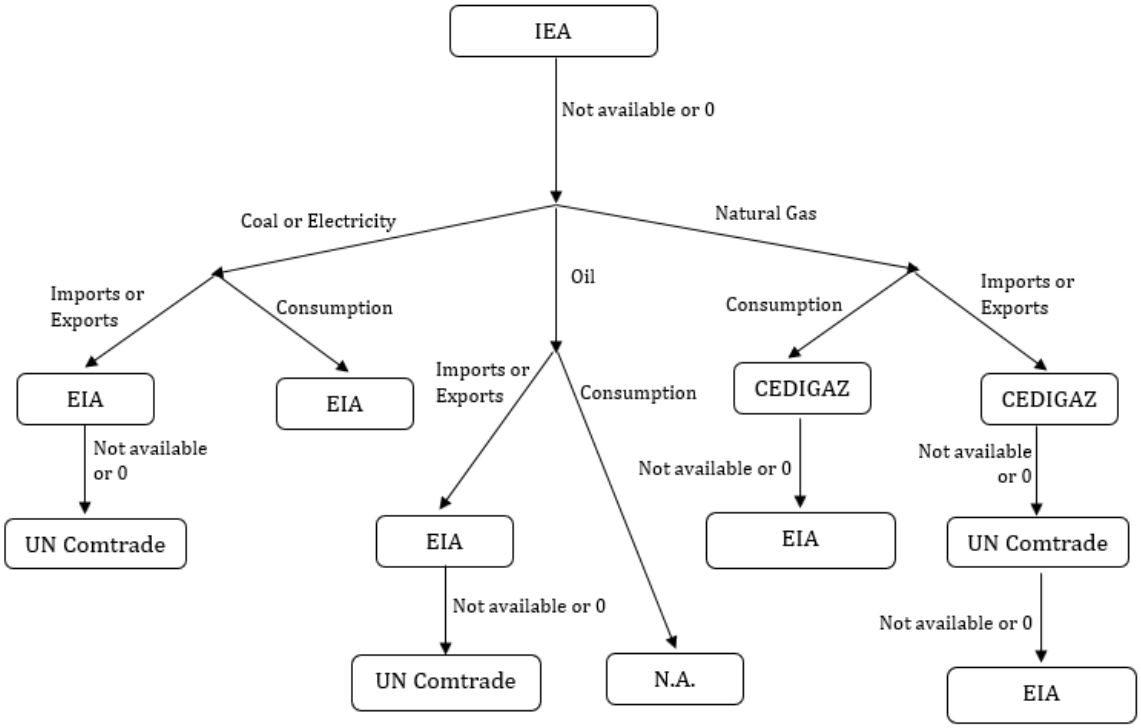

Figure 3: The Order of Preference in Compiling Resource-based National Trade and Consumption Figures

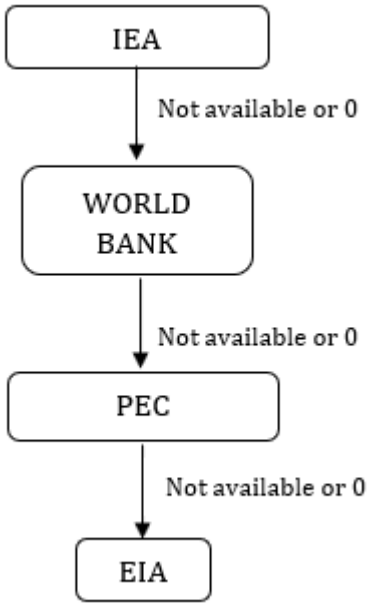

Figure 4: The Order of Preference in Compiling National Gross Energy Consumption Figures

5.5.Issues in Synchronization

Between these datasets exists discrepancy in country codes, spatiotemporal coverages (e.g. due to the foundation and break up years of countries), commodity codes, and units of these commodities. Therefore, merging all these data sources into one set requires utmost attention in synchronization.

Country Codes: The IEA database has inconsistencies in country codes ***across*** different series. Even though the coding system in IEA mostly matches with ISO Alpha-3 country codes, I singled out mismatches[23] and made them compatible with ISO Alpha-3 codes. The UN Comtrade database reports country codes compatible with ISO Alpha-3 system as well as its numeric codes. My extensive analysis on the whole dataset, however, reveals inconsistencies between the letter and numeric codes where some letter codes are mistakenly

[23] In series reporting coal, oil, and electricity information, codes of the following countries are inconsistent with ISO Alpha-3 codes: Kosovo, Taiwan, Mauritius, U.S.S.R., Former Yugoslavia. Codes in natural gas and global information datasets are almost incompatible with ISO Alpha-3 codes. Therefore, I standardize all information series according to ISO Alpha-3 codes.

recorded.[24] The World Bank database is fully compatible with ISO Alpha-3 country codes. Primary Energy Consumption (PEC) data—extracted from National Material Capability dataset—use Correlates of War (COW) numeric country codes and abbreviations which is totally different from ISO system. Therefore, I merged each COW code with a corresponding ISO Alpha-3 letter code to make PEC dataset ready to be synchronized. The CEDIGAZ and EIA databases use whole country names when reporting data. Apart from the EIA, CEDIGAZ database separately reports each of seven cantons in the United Arab Emirates. Therefore, I summed up these separate figures and specified the total figure into one country—the United Arab Emirates.

Spatiotemporal coverages: Spatiotemporal coverages of countries differ across the IEA and UN Comtrade databases. Since information on energy (i.e. trade and consumption figures) comes mainly from national statistical agencies or energy departments, data compilers have no choice, but rely on what has been reported. Therefore, discrepancies may occur across different databases in terms of calculation methods and coverage. Compared to the UN Comtrade and EIA databases, the IEA and CEDIGAZ databases[25] are the most reliable sources for energy figures; because, in addition to national statistical offices, they publish estimates for energy figures in consultation with energy companies and national energy experts. Still, they have difficulties in obtaining energy figures for specific countries.

To ensure compatibility between the utilized datasets, I made the following adjustments:

1. Since the UN Comtrade database reports trade figures of Belgium and Luxembourg jointly until 1998, I summed up separate figures of these two countries in other datasets until 1998.
2. Trade and consumption values of China and Hong Kong are reported separately for all available years in the UN Comtrade and IEA databases. For the post-1997 period, when British sovereignty over Hong Kong was officially transferred from the U.K. to China, I got the summation of these values and assigned them to China.

[24] I detected inconsistency in some letter code entries of Democratic Republic of Congo which should be "COD," but is coded as "DDR" (ISO Alpha-3 code for German Democratic Republic). For this reason, I recoded country letter codes according to their numeric code to eliminate possible mismatching problems.

[25] I did not list World Bank database here because it gets energy-related data directly from the IEA.

3. Trade and consumption figures for the Czech Republic and Slovakia start to be reported from 1971 onwards at the IEA database, and thus, no data is available for former Czechoslovakia. For period 1971–1992, I summed these separate values and marked them as Czechoslovakia.
4. In the IEA and UN Comtrade databases, statistics for France includes Monaco. Therefore, I made the relevant adjustments in the PEC dataset, where Monaco reported separately.
5. In the IEA database, statistics for Italy includes San Marino and the Holy See. I made the corresponding adjustments in the UN Comtrade and PEC datasets.
6. In the IEA database, statistics for Switzerland includes Liechtenstein for the oil data. The UN Comtrade database also reports all energy trade figures of Liechtenstein included in that of Switzerland. Therefore, I incorporated figures of Liechtenstein into that of Switzerland in other utilized datasets.
7. Oil and trade statistics of the U.S. include Guam, Puerto Rico and the U.S. Virgin Islands in the IEA dataset. I expanded this inclusion to other resources and made the required adjustments in the other datasets.
8. In the IEA database, statistics of Denmark includes the oil trade and consumption figures for Greenland until 1989. Corresponding adjustments have been made in other datasets.
9. The IEA admits 1990 as the breakup year for the U.S.S.R and the former Yugoslavia. ISO Alpha-3 system, however, marks 1992 as the breakup year. I adjusted the corresponding records in the IEA dataset based on ISO Alpha-3 system.
10. The IEA does not distinguish Serbia and Montenegro and Serbia while reporting statistics, but the UN Comtrade does. I re-arranged country names in the IEA datasets based on the UN Comtrade specifications.
11. The IEA, World Bank, and CEDIGAZ datasets jointly report statistics of the East and West Germany for the period prior to 1990. Therefore, I made the corresponding adjustments in the other datasets; I marked Germany as a unitary state for years before 1990.

Commodity Codes and Units: The IEA and UN Comtrade databases have no common commodity coding systems. Even though some specific commodity names coincide with one

another, setting a common field for direct comparison of trade figures requires a meticulous design. The IEA, expectedly, reports trade statistics of each source in a standardized nomenclature and unit. While coal and oil trade statistics are reported in kilotons (kt), natural gas statistics are reported in both million cubic meters (bcm) and terajoules (TJ). Consequently, I decided to rely on data reported in BCM and convert them to MJ. and electricity statistics are reported in megawatt-hours (MWh). National and global level trade and consumption statistics are reported in kilotons of oil equivalent (KTOE). In the energy dataset, I converted each variable of interest into megajoules (MJ), and calculate energy dependence based on ratios of values in MJ. Using natural gas statistics in TJ would be convenient for me, but I detected incompleteness in data reported in TJ—some dyad-years were missing.

The UN Comtrade, however, suffers in terms of standardized nomenclature and units while reporting trade statistics. Changes in versions of SITC and the inability to retrospectively update commodity codes based on newer versions of SITC complicate synchronization, not only within the same database but also across other datasets.[26] Trade flows of coal are reported in kilograms (kg), and that of electricity in MWh. Oil and natural gas flow, however, lack standardization in units. While they are mostly reported in kg, I observed that they are also reported in liters (l) for some dyad-years. Therefore, before converting trade statistics into calorific values, I converted units in oil into kt, and natural gas into bcm. To circumvent compatibility problems in commodity codes between the IEA and UN Comtrade datasets, I decided to group commodities with respect to their average calorific values in a given source. Table 4 shows these groups, as well as unit conversion factors.

[26] SITC Rev.1, the simplest and least detailed coding system, covers years from 1962 onwards. SITC Rev. 2 started to be applied in 1976, and SITC Rev. 3 in 1988. Therefore, we lose detailed information about commodities traded as we go back.

Table 4: Conversion Table Used to Synchronize Units to Megajoule*

Product Groups	**IEA**	**UN Comtrade**		**MJ/kg**		
		SITC Rev. 2	**SITC Rev. 3**			
ANTHRACITE	Anthracite	Anthracite	Anthracite	30		
OTHER COAL	Bituminous coal Coking coal Sub-bituminous coal	Other coal	Other Coal	25.1		
LIGNITE	Lignite	Lignite	Lignite	14		
PEAT	Peat	Peat	Peat	10		
HIGH COAL PRODUCTS	Oven coke Patent fuel Coal tar	Coke and semi-coke	Coke and semi-coke	29		
LOW COAL PRODUCTS	Briquettes of brown coal Peat products	Briquettes of coal/lignite/peat	Briquettes of coal/lignite/peat	12		
				MJ/kg	**kg/l**	
CRUDE OIL	Crude petroleum NGLs Refinery feedstocks Additives/oxygenates Other hydrocarbons	Crude oil, non-refined petroleum	Crude oil, non-refined petroleum Petroleum/ hydrocarbon gas	45.31	0.853	
HIGH OIL PRODUCTS	Aviation gasoline Motor gasoline Gasoline type jet fuel Kerosene type jet fuel Gas/diesel oil Fuel oil Other kerosene Refinery gas Naphtha	Refined petroleum products	Heavy petroleum products	47.3	0.811	
LOW OIL PRODUCTS	White Spirits & SBP Lubricants Bitumen	Residual petroleum products	Residual petroleum products	39.5	0.95	

	Paraffin waxes Petroleum coke Other products					
LPG	LPG Ethane	Liquid propane & butane	Liquid propane & butane	50.8	0.53	
				MJ/kg	**kg/l**	**MJ/cm**
NATURAL GAS, PIPE	Natural gas, gaseous	Petroleum gases and other gaseous hydrocarbons	Natural Gas (Gaseous)	Norway=52.6 Netherlands=45.2 Russia=54.42 Others=50.7	0.00077	Norway=42.5 Netherlands=35.4 Russia=37.8 Algeria=39.2 Others=38.95
LNG	LNG	Liquefied gaseous hydrocarbons	Liquefied Natural Gas (LNG)	54.4	0.45	40
				MJ/MWh		
ELECTRICITY	Electricity	Electricity	Electricity	3600		

*MJ/toe=41868; MJ/tce=29307.6

Table 5 reports number of observations provided by the data sources that I used in a directed-dyad--year format.

Table 5: Observations Provided by the Data Sources

COAL	***IEA***	113,508
	COMTRADE	21,278
	MONADIC FIGURES	945,971
	TOTAL	1,080,757
OIL	***IEA***	137,892
	COMTRADE	106,594
	MONADIC FIGURES	97,817
	TOTAL	342,303
NATURAL GAS	***IEA***	196,318
	CEDIGAZ/COMTRADE	4,980
	MONADIC FIGURES	963,048
	TOTAL	1,164,346
ELECTRICITY	***IEA***	69,594
	COMTRADE	1,632

	MONADIC FIGURES	1,133,534
	TOTAL	1,204,760
TOTAL DIRECTED-DYAD–YEARS		1,528,696

5.6.Appraisal

This chapter detailed compilation procedures of the Energy Interdependence Dataset: introduced data sources, explained synchronization procedures, enumerated problems encountered, and solutions developed throughout the compilation process. The main challenges in the construction of this dataset have occurred in the process of synchronization of data obtained from various sources. The dataset, presented in a monadic, dyadic and directed-dyadic format, covers the globe for the years between 1978-2012. It facilitates research on energy dependence in a number of ways: (i) the data has been compiled from various sources which provide a double-check for interstate energy trade as well as national energy consumption and trade figures, (ii) the dataset standardizes information given and

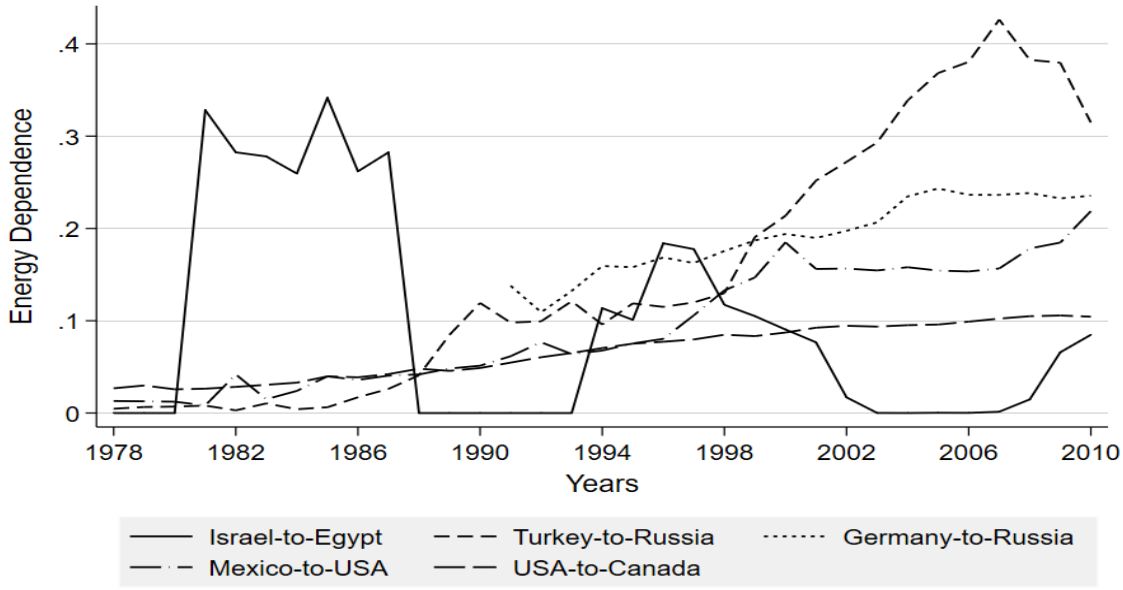

Figure 5: Dyadic Energy Dependence Figures for Some Dyads (1978–2014)

numbers reported in the databased utilized, (iii) the energy figures are broken down by resource, hence allowing for nuanced analysis of how interstate relations change over time, and finally, (iv) the dataset utilizes COW and ISO3 country codes, hence facilitating its integration to other datasets. The dataset covers dyadic energy dependence figures of 201

countries. It includes 46666 different directed-dyadic relationships. Overall, it reports 1278290 time-series cross-sectional observations in directed-dyad–year format. Figure 5 shows energy dependence figures of some countries for the period of 1978–2014 based on my dataset.

CHAPTER 6

6.1.Introduction: Empirical Investigation of the Impact of Energy Interdependence on Interstate Relations

The study of international conflict represents the touchstone of the field of international relations. The question of when interstate conflicts lead to the use of militarized force or even cause war is a central question within this topic (Bennett & Stam III, 2004). Research on correlates of such interstate conflict has immensely benefited from inquiring into dyadic qualities of potentially conflicting states. Whether or not both states are democratic (Russett & Oneal, 2001; Maoz & Russett, 1993), the extent and the nature of trade ties between the two states (Polachek, 1980; Gelpi & Grieco, 2008); similarity of cultural and domestic political institutions within the dyad (Huntington, 1996; Henderson & Tucker, 2001), frequency of joint membership in international organizations (Oneal et al., 2003), as well as the institutional quality of these organizations (Bearce & Omori, 2005) are among many dyadic factors that have been systematically studied and shown to affect the probability of interstate crisis onset and the propensity of these crises to escalate to the use of militarized force. One of the aims of this chapter is to investigate the role of energy interdependence in shaping interstate conflict in the light of this established line of literature on the dyadic factors.

Energy interdependence may also shape interstate relations beyond international conflict. As suggested by energy politics scholars, vulnerability stemming from the dependence to a supplier for a critical energy resource may lead importer country to bend to wishes of its supplier (Harsem & Claes, 2013; Shaffer, 2009). This section will also investigate whether or not energy interdependence leads to convergence in the decision of states in international organizations. Neoliberal-functionalist theory underpins this line of thinking. A group of states may institutionalize their trading relations through various

economic agreements (e.g. customs unions, long-term preferential purchasing agreements, joint infrastructure investment projects). Such institutionalized groups reduce opportunistic behavior and optimize resource allocation within participating countries, hence increasing gains from the economic interaction among states (Abbott & Snidal, 2000). Sustaining these gains is a major motivation for states to cooperate with each other, as a result, these "preferential groupings establish a forum for bargaining and negotiation that dampens interstate tensions, promotes reciprocity, and facilitates the resolution of conflicts before they escalate" (Mansfield & Pevehouse, 2003, pp. 776).

Moreover, energy trade often requires long-term investments (e.g. long-term procurement contracts, long-term operation schemes as nuclear plant operation contracts evince, large-scale gas and oil transport projects) (Shaffer, 2009; Lee, 2017), which may encourage states towards longer-term cooperation. This cooperative stance, in turn, may lead to a convergence in foreign policy preferences.

Alternatively, the vulnerability against potential disruption in energy flows may also shape states' decision in a way to not bother the supplier and bend to its wishes (Keohane & Nye, 1977; Lee, 2017). This study discusses all these possible explanations in the light of energy politics and interdependence theory in IR. The following subsections will show the results of empirical tests employing our innovative energy dependence measure and provide the corresponding investigation of hypotheses derived out of the literature.

6.1.1. Energy (Inter)dependence and Interstate Relations

One of the aims of this section is to investigate the accuracy and generalizability of the arguments put forward by the scholars of IR and energy politics. In doing so, I need to build upon the existing empirical investigations and consider comparability of my results with previous ones, so that I can contribute to cumulative knowledge. My goal, in general, is to explain variations in the trade–conflict relationship in the framework of energy interdependence. In particular, my analyses rest on the investigation of dyadic interstate relationship. In line with the arguments proposed by the literature, I will examine whether countries act differently towards their partners, depending on the extent to which they rely on these partners in energy trade. This reliance, however, is not to income, but to energy resources. Recalling Lee (2017), I will focus on dependence on energy resources, disruption

of which, in fact, causes much harm than not gaining income out of these resources.

Focusing on variance in behaviors of countries in world politics and/or towards their partners as a result of their dependence level to energy resources offers a quite different platform for our investigations than asking the question of whether trading countries are more peace-prone or the trading world is more peaceful. Rather than offering a systemic investigation, my approach aims to offer interstate (or dyadic) level analyses. The dyadic relationship can be affected not only from energy interdependence levels between them but also by many other country-specific attributes: economic development, military power, regime type, or geographic proximity. My criterion for dyadic coverage is based on the data availability in the dependent variable and the explanatory variable of interest for countries involving a dyadic relationship. As a result of this criterion, my empirical analyses cover the period of 1978–2010. Having this period for the analyses is also conducive to the generalizability of the results because relevant data are available for most of the countries in the world regardless of being developed or not. Therefore, I expect little bias regarding the possible association between data availability and the level of development of a country.

My empirical investigations will rely on directed-dyad– and non-directed-dyad–year as units of analysis. The former is used to investigate the conditions of behaviors of a potential energy importer against its supplier. The reason for such a choice is to aim the examination of energy-dependent countries' behaviors towards their supplier. The previous discussions (Cameron, 2007; Harsem & Claes, 2013), as well as empirical investigations (Hendrix, 2015) justify this choice because the gist of the arguments in energy politics have mostly been grounded on the vulnerability that dependence to energy resources may lead to, and hence, potential role of energy dependence on interstate relations have been formed according to the implications of this vulnerability, or dependence. The latter—non-directed-dyad–year—is employed to investigate the conditions of conflict within dyads, where the direction of behavior or action within a dyad is indeterminate. In these analyses, I focus on not the role of energy dependence, but that of overall energy interdependence level within dyads on interstate relations.

To examine whether energy (inter)dependence leads to more cordial or conflictual relationship, clarification on what we mean by peaceful relationship or violation of peace is

necessary (Barbieri 2002). As Domke (1988) assumes, peace is underway when we observe no war between states. Although it is intuitive, embracing the absence of war to identify a relationship as a peaceful one has been found quite narrow by some other scholars. For instance, peace can also be described in a form of high cooperation between countries despite some unexpected or unpleasant violent events (see "net conflict" conceptualization of Polachek (1980)). In Barbieri's conceptualization, having peace should transcend the situation of being good-intended and force countries to avoid violence against one another. In fact, having interdependence relationship does not guarantee that partners would never involve in a conflictual relationship, or on the contrary, it does not assure that partners would further cooperate (Eckhardt & Azar, 1979; Hower, 1990). Then, the point worth investigating is the extent to which interdependence makes partners refrain from resorting to violent behavior against each other. Therefore, conceptualization of peace in a form of the absence of militarized conflict serves our empirical end more aptly, compared to that of high-level cooperation.

Another implication of such a conceptualization is that any nonviolent strategy to resolve ongoing conflictual relationship is acceptable. Put differently, any military action short of war violates peacefulness, such as threat, use of force, coercion, and compulsion. Therefore, while investigating the relationship between interdependence and conflict, we indirectly assume that interdependence between partners affects the way they resolve the conflicts between them. Under these circumstances, the question that we ask is whether the pacifying impact of interdependence could mitigate incentives to use force in case conflict of interest heightens between countries (Barbieri, 2002, pp. 51).

Empirical studies using a quantitative method to investigate the relationship between trade and conflict have relied primarily on Militarized Interstate Dispute dataset of the Correlates of War Project (Jones, Bremer, & Singer, 1996). This dataset helps researchers measure interstate conflict in forms of militarized disputes taking place. These disputes may include actions short of war or full-fledged wars. The absence of militarized disputes, in fact, indicates peace between countries. Militarized Interstate Disputes (MIDs) are coded as a dichotomous variable identified by "a set of interactions between or among states involving threats to use military force, displays of military force, or actual uses of military force" (Gochman & Maoz, 1984, pp. 586). Dyads are coded as one when they engage in a dispute

on opposite sides and zero otherwise. In a given year, only one dispute can be coded for a particular dyad, that is, multiple disputes in a given year are counted only once. The MID dataset not only provides a measurement for conflicts but also gives information about the features of these conflicts. In the following analyses using MIDs as my dependent variable, I will probe the hypotheses that (i) whether countries that are highly energy-dependent on their partners are less likely to initiate a MID against these partners and (ii) whether pairs of states with higher energy interdependence levels are less likely to involve in a MID. While analyses of the first hypothesis require directed-dyadic setting due to my focus on the unilateral behavior of one of the members in a dyad with respect to the level of energy dependence, that of the second hypothesis require non-directed-dyadic setting due to my focus on within-dyad event occurrences with respect to the overall level of energy interdependence.

Having militarized disputes as the only dependent variable to investigate interstate relations may lead us to overlook cases where intensified political disagreements end up short of militarized disputes (Gartzke, 2007). Since we have observed increasingly rare numbers of interstate conflict in recent decades, examination of the impact of interdependence on interstate militarized disputes might become less relevant, at least at the onset stage of conflicts. Reducing the investigation of the relationship between energy interdependence and interstate relations only to militarized conflicts do not totally represent the overall relationship between states. Interdependence could reduce the overall likelihood of engaging military disputes and of escalation of these disputes. Increasing vulnerability in an economic relationship, however, may give rise to mutual security concerns, and correspondingly, incite states to take measures leading to an increase in tensions in a form of security competition. Some scholars have argued that interdependence, overall, leads to more frequent political conflicts and deepened economic and security competition between interrelated states. Both sides, to decrease its dependence on another, take some actions which in turn may jeopardize the security and economic positions of the other side—like a security dilemma (Mansfield & Pollins, 2001).

The lack of specification in proxying international cooperation while explaining the relationship between interdependence and interstate relations limits our understanding and the number of hypotheses to be produced under the light of IR literature (Mansfield & Pollins,

2001). Put differently, sustaining peace without engaging in a dispute might be a proxy for interstate cooperation, but not inform us completely about the level of interstate cooperation. A number of empirical studies examine states' tendencies of international cooperation using different measurements as proxies for cooperation, such as whether a state becomes a member of intergovernmental organizations (IGOs) (Mansfield & Pevehouse, 2006), acquiesces to international courts, accepts legalized dispute resolution (Moravcsik, 2000), involves in deeper regional integration (Mansfield, Milner, & Pevehouse, 2008), join United Nations (UN) Peacekeeping Operations (Lebovic, 2004), and cooperate in general through international institutions (Martin, 2000). Most of these studies fail to provide evidence regarding the renowned affirmation that economic interdependence increases international cooperation (Mansfield & Pevehouse, 2006, 2008). The lack of evidence, however, might be due to the failure of marking out traded commodities while analyzing the relationship.

A visible international platform upon which convergence of interests or cooperation may reflect is United Nations General Assembly (UNGA) voting patterns. While a number of studies look at what makes states vote along similar lines in the UNGA (e.g. Dreher & Sturm, 2012; Holloway, 1990; Wang, 1999), the role of energy interdependence on UNGA voting similarity has not been examined yet. Using Hage's (2011) Foreign Policy Similarity dataset, I employ the similarity index in United Nations General Assembly (UNGA) voting patterns (Voeten, 2013) of states as my dependent variable and investigate whether higher energy interdependence within dyads does increase similarity in their foreign policy decisions.

6.2.Energy Dependence and Conflict Initiation

6.2.1. Dependent Variable

In order to test hypotheses regarding the impact of energy dependence on the likelihood of militarized dispute initiation that could be made by a potential challenger against a particular target, I use a dataset covering all possible dyadic interactions for each year from 1978 to 2010. Therefore, the unit of analysis is the directed-dyad–year. This dyadic design does not help us make predictions about the systemic or the specific causes of war-proneness, but rather it allows us to make predictions regarding who is likely to involve in a conflict with whom under which conditions. A directed-dyadic setting distinguishes dyadic cases of, for

instance, Turkey vs. Russia from Russia vs. Turkey; while the former indicates that Turkey initiates a dispute against Russia, the latter indicates that Russia initiates a dispute against Turkey. Such a distinction is required because I am interested in the conditions influencing the decision of one state to initiate a dispute against another; not the conditions associated with the occurrence of a dispute with a dyad. The temporal domain is determined by data availability.

The dependent variable is coded as 1 if the challenger initiates a militarized interstate dispute (MID) against the target in a given year, and 0 otherwise. A MID is defined as an event "in which the threat, display, or use of military force […] by one member state is directed towards […] another state" (Jones et al., 1996, pp. 168). MIDs may not culminate in full-fledged wars; most of them end short of war. I use (Palmer, d'Orazio, Kenwick, & Lane, 2015) MID data (version 4.0). In directed-dyadic design, only primary initiators and primary targets that are involved in a conflict with one another are counted as disputants; joiners of ongoing disputes are not included. Primary initiators are those countries that engage in a dispute at its first day and on the side that acts first; primary targets are those countries that are engaged in a dispute at its first day and on the side that incurs hostile actions of primary initiators.

6.2.2. Independent Variable

The main independent variable of interest is basically the energy dependence of a state on its potential partner. The energy dependence variable is calculated as follows:

$$ED_{ij,m,t} = \frac{Exports_{ji,m,t}}{Total\ Consumption_{i,m,t}} \times \frac{Total\ Consumption_{i,m,t}}{Gross\ Energy\ Consumption_{i,t}}$$

where $ED_{ij,m,t}$ is energy dependence of country i to country j for energy resource m at yeat t. $Exports_{ji,m,t}$ denotes the exports of country i from country j for energy resource m at yeat t. While total consumption corresponds to inland consumption figures of importer country for a given energy resource, gross energy consumption gives the total inland energy consumption comprising all resources. This formulation calculates four different energy dependence variables with respect to four primary energy resources—coal, oil, natural gas, and electricity. To calculate overall energy dependence variable, I simply get the total of

these four energy dependence figures. Missing values are treated as zeros if at least one of these four energy dependence figures is available. Otherwise, I left overall energy dependence variablethe as missing. I expect a negative impact of energy dependence on conflict initiation.

6.2.3. Control Variables

While making the empirical analyses estimating the effect of energy dependence on the likelihood of dyadic disputes, controlling for the usual suspects that may influence our independent variable, dependent variable. Otherwise, these analyses do suffer heavily by omitted variable bias, and thus, the relationship that I present based on these analyses could be spurious. In my analyses, I will control for the following factors: contiguity, regime types, relative power, major power status, economic relationship levels, economic development levels, foreign policy similarities, alliance ties, and temporal dependence.

Contiguity: Being contiguous increases not only the volume of mutual trade between countries (Arad & Hirsch, 1981), but also the likelihood of intense conflicts (Bremer, 1992; Goertz & Diehl, 1992; Vasquez & Henehan, 2001). Underlying arguments explain the relationship between a geographical proximity and conflict by referring to the contact theory—conflicts of interest are observed more likely between countries having frequent levels of contact (Waltz, 1979)—or the issue salience—geographical proximity may lead to conflicts related to severer issues more frequently between countries, such as territorial issues (Goertz & Diehl, 1992). Similar arguments might also remain valid for trade–conflict nexus: higher levels of interaction led by trade might trigger conflicts over a trading relationship or other issues.

I use Stinnett, Tir, Schafer, & Gochman's (2002) “Contiguity” definition to generate a binary variable which is equal to one if the dyad members are directly contiguous or separated by fewer than 125 miles of water. I expect a positive impact of contiguity on conflict initiation.

Regime Type: Regime types of countries appear as an important factor to control while estimating the relationship between interdependence and conflict. A law-like theory of democratic peace has been empirically verified so many times: democracies do no fight with

one another (Bremer, 1992; Dixon, 1993, 1994; Maoz & Abdolali, 1989; Maoz & Russett, 1993; Morgan & Campbell, 1991; Morgan & Schwebach, 1992; Ray, 1995, 1998). Owing to differences in domestic political institutions (i.e. elections, audience cost), democracies may diverge from autocracies in a way to refrain from engaging in a conflict straightforwardly. Apart from affecting conflict tendencies of countries, especially similarity in regime types has been conceived to affect trading relationships in a positive direction (Dixon & Moon, 1993; Polachek, 1997).

I use data from Polity IV (Jaggers & Gurr, 1995) to operationalize regime types of countries, which comprises scaled information of countries' democracy levels. I identify a regime type of a given country as a democracy if the country has a Polity score (democracy score–autocracy score) of six or greater. Then, I generate a binary variable of "Joint Democracy" if both dyad members are a democracy.

Relative Power: The relationship between relative power and conflict has been discussed by many theorists and divergent positions among them have emerged; whether power preponderance or a balance of power leads to peaceful relationship remains as an empirical question (Morgenthau, 1963; Organski & Kugler, 1980). Empirical studies investigating the dyadic relationship between countries show that power preponderance, not a balance of power, is conducive to promoting peace (Bremer, 1992; Kugler & Lemke, 1996).

To operationalize relative power status of a given country vis-à-vis its opponent, I use the COW Composite Index of National Capabilities (CINC) dataset. This dataset provides a composite index (CINC) score including salient factors contributing nationals power of a state, such as military spending, military personnel, iron, and steel production, total population, urban population, and total primary energy consumption. CINC score ranges from zero to one. Using the CINC score, I calculate relative power as the ratio of the capabilities of the potential initiator to the dyadic sum of the capabilities (Singer, 1988). Relative power measure ranges from zero to one; the smaller the values are, the stronger the potential initiator is (compared to the potential target).

Power Statuses of States: Whether a state is a major or minor power is another factor that may influence conflict tendencies. According to the literature, major powers are expected to be more likely to involve in MIDs (Bremer, 1992). Based on Small and Singer's (1982) list

indicating Major Powers—the U.S., the U.K., Russia, China, Japan, Germany, and France—, Major Power status of states is coded as 1, and 0 otherwise. The variable is equal to 1 when both members of a dyad are Major Powers.

Alliances: Alliance ties may affect both the likelihood of observing conflict within a dyad and the level of trade between states. Scholarly studies hypothesize that alliance ties make the conflict between states less likely. Although such a hypothesis lacks firm theoretical and empirical agreement (Bueno de Mesquita, 1981; Bremer, 1992; Maoz & Russett, 1993), many empirical studies have included a variable corresponding to formal security alliances in their models of conflict initiation and onset (Braithwaite & Lemke, 2011). Besides having influenced the conflict proneness within a dyad, alliance ties may also affect the level of trade between state—states are more likely to trade with their allies (Gowa, 1994). To operationalize interstate alliance, I use Gibler and Sarkees's (2004) defense pacts data. "Allied" is a dichotomous variable equal to one if states have a defense pact with one another. Defense pacts indicate whether parties of the dyad both join in a treaty of alliance providing security guarantees of mutual assistance in the incidence either party is attacked. This type of alliance is the highest degree of common security interests which is very powerful to make parties avoid conflict and escalation.

Foreign Policy Similarity: Since a conflict of interest between states is one of the main reasons for them to engage in a dispute, the extent to which their international interests are in compliance with one another may also affect conflict propensities within a dyad. Conflict is presumed to be less likely between countries having agreed on major issues in their foreign policies (Bueno de Mesquita, 1981; Gartzke, 1998). To operationalize foreign policy similarity, I use Hage's (2011) FPSIM (Foreign Policy Similarity) Dataset v2.0. This dataset includes several similarity scores—unweighted or weighted (with respect to capabilities)—and all these scores use either the similarity in alliance portfolios (Bueno de Mesquita, 1981; Signorino & Ritter, 1999) or the similarity in United Nations General Assembly (UNGA) voting patterns (Voeten, 2013) of states as their basis for the operationalization. In my analyses, I rely on UNGA voting similarity scores to proxy foreign policy similarity within dyads. Each similarity score ranges from -1 to 1; larger numbers indicate greater similarity in international interests.

Trade Dependence: Motivated by optimistic arguments of classical liberal, scholars have empirically investigated the pacifying effect of trade interdependence on interstate conflict. Although some scholars have demonstrated the conflict-promoting impact of this type of interdependence within dyads (Barbieri, 1996), a number of studies have confirmed that trade interdependence decreases the likelihood of engaging in militarized disputes (Oneal & Russett, 1997; Polachek, 1980; Gasiorowski, 1986). The more extensive trade ties that pairs of states have, the higher expected cost of conflict that partners would incur. To measure trade interdependence, I rely on Correlates of War (COW) Project Trade Dataset v4.0 (Barbieri et al., 2009).

Trade dependence of a country on its partner is calculated based on total dyadic trade—imports and exports—as a share of total trade (Oneal & Russett, 1997). Trade dependence figures conform to a uniform scale that ranges from 0 to 1.

Economic Development: Economic development levels of states may affect both conflict likelihood between states and their trading relationship. As countries' economic development figures increases, they might refrain from involving in militarized disputes to not sacrifice their current economic welfare. On the contrary, countries suffering from adverse economic shocks may tend to involve in interstate conflicts in order to turn attention away from domestic problems (Ostrom & Job, 1986).

Moreover, economic development may influence trading patterns between states: a state with relatively higher economic development could be deemed as a primary producer of value-added products—the products that other states may, most probably, need. Relying on Reed's (2000) operationalization of economic development and using Gleditsch's (2002) Expanded GDP Dataset v6.0, I calculate economic development variable of a given country as an annual percentage change in real GDP per capita figures.

Temporal Dependence: While estimating the impact of energy interdependence on the likelihood of militarized disputes that partners might engage in, I employ logistic regression. Like in ordinary least squares (OLS) regression model, logistic regression models have an assumption that events are independent of one another. In the real world, however, the outbreak of one militarized dispute might trigger others prospectively. Conversely, quite long non-event period might reduce the probability of event occurrence; prolonged peace may

induce further peace. Since militarized disputes are relatively rare events and most of the binary observations in the dependent variables are zero, failing to control for temporal dependence leads to biased estimates. Therefore, to make sure that my estimation results are free of bias, I need to control for temporal dependence between events—in my case they are militarized disputes.

Beck, Katz, & Tucker (1998) suggest that temporal dependence in logistic regression models with binary dependent variables can be controlled by including a variable that counts the number of years since partners were last involved in a militarized dispute—named peace-years. Therefore, I include peace-years variable as well as its cubic polynomial specification as Carter & Signorino (2010) suggest. The peace-years variable is expected to be negatively correlated with militarized dispute occurrence.[27]

For the econometric analyses, I employ logit—the most commonly used estimation technique for models having dichotomous dependent variables. Traditional logit model, however, assumes that events are independent of each other, which is inappropriate for a time-series cross-section (panel) dataset. Since my dataset consists of iterated observations, and maybe events, of the same dyads over time as well as observations of myriad dyads in the same year, traditional logit model might suffer from both cross-sectional and inter-temporal correlation in the error terms. To fix this problem, I corrected standard errors based on dyadic groups. With this correction, standard errors now allow for intra-group correlation, which in fact relaxes the assumption that the event is independent. That is, the events are independent across groups (clusters), but not necessarily within groups.

Moreover, to check the robustness of my estimates I replicate all model with a generalized estimating equation (GEE) estimation. As a direct extension of the Generalized Linear Model (GLM), GEE is a quasi-likelihood method providing information about the relationship between the expected value of the dependent variable and the covariates in the

[27] I am aware of the possible endogeneity problem between peace years and interdependence. In fact, the probability of involving in a conflict may be lower for pairs of states having long history of interdependence. We might still expect a difference in the likelihoods of future conflict between dyads having long history of interdependence and those having never been interdependent although they both have experienced a dispute recently. Controlling for peace years does not consider such possibility; because the logic behind using this variable assumes that the number of years elapsed since the last dispute is independent of other covariates included in the analysis (Beck et al., 1998). Therefore, peace years variable is apt to be a function of interdependence (Oneal, 2003).

context of panel data. GEE estimation is proposed to properly examine differences among groups identified by specific characteristics (Zorn, 2001). Since I want to estimate how variance in energy dependence affects the average probability of dispute initiation across the population, GEE aptly serves my needs. I again correct the standard errors for heteroskedasticity among clusters (dyadic groups) and correct for autocorrelation using a common rho estimated from the data. My only criterion to include dyads in these analyses is based on the availability of data for the members of the dyad and for dyadic interactions and energy trade.

6.2.4. Results

Table 6 shows logit (Model 1) and GEE (Model 2) estimation results respectively. In both models, increase in energy dependence of a potential initiator statistically significantly reduces the likelihood of the MID initiation against its partner. This finding supports the idea that energy dependence brings about the vulnerability for a dependent side, which in turn curb incentives to engage in a conflict with the supplier to not disrupt ongoing energy flow. Even after controlling for trade dependence variable, having observed such a significant result indicates the importance of marking out traded commodities while analyzing the interdependence and interstate relations nexus.

The control variables yield expected results for those familiar with empirical analyses of interstate conflict, except alliance ties which have unintuitively positive and significant impact on conflict initiation probability. Contiguity appears as one of the strongest predictors of dyadic conflict: geographical proximity is highly conducive to a conflictual relationship. Democratic states are less likely to initiate MIDs against their democratic counterparts. This finding upholds the law-like theory of democratic peace. Major powers seem more likely to be one of the sides in dyadic conflicts. The coefficient of relative power shows that relatively powerful states are more likely to initiate conflict. The similarity in foreign policy preferences is also conducive to interstate peace. The peace years variable, which is negative and statistically significant as expected, suggests that pairs of states with prolonged peace are less likely to involve in another dispute. The spline variables indicate that the temporal dependence between observations diminishes as the peace counter increases.

Table 6: Energy Dependence and Militarized Interstate Dispute Initiation

Independent Variables$_{(t)}$	(Model 1) Dispute Initiation$_{(t)}$	(Model 2) Dispute Initiation$_{(t)}$
Energy Dep. of Initiator	-2.062***	-2.315***
	(-2.97)	(-3.12)
Contiguous	3.288***	3.354***
	(21.40)	(21.28)
Initiator is Democracy	0.0200	0.0179
	(0.15)	(0.13)
Target is Democracy	0.219	0.195
	(1.64)	(1.41)
Joint Democracy	-0.680***	-0.667***
	(-3.51)	(-3.31)
Initiator is a Major Power	0.580***	0.620***
	(3.25)	(3.41)
Target is a Major Power	0.749***	0.724***
	(2.94)	(2.74)
Both Major Powers	-0.360	-0.263
	(-0.66)	(-0.47)
Relative Power of Initiator	0.654***	0.675***
	(3.58)	(3.56)
Trade Dep. of Initiator	0.916	0.863
	(1.02)	(0.98)
Econ. Growth of Initiator	0.192	-0.0854
	(0.57)	(-0.24)
Foreign Policy Similarity	-1.240***	-1.321***
	(-5.35)	(-5.87)
Allied	0.371***	0.380**
	(2.61)	(2.55)
Peace Years	-0.226***	-0.193***
	(-12.69)	(-10.99)
Spline 1	1.843***	1.533***
	(6.64)	(5.68)
Spline 2	-5.967***	-4.964***
	(-4.66)	(-4.12)
Spline 3	-11.41	-11.27
	(-0.98)	(-1.26)
Constant	-4.679***	-4.935***
	(-20.20)	(-20.77)
Observations	552517	552517
Pseudo R^2	0.398	
Estimation	logit	xtgee
Test	Wald	Wald
Chi-squared	2497.4	2288.0
Log-likelihood	-3835.7	

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The results reported at Table 6 are based on estimations between the dependent variable and independent variables at time t. Echoing the reciprocal nature of the trade–conflict relationship, employing lagged independent variables might be necessary. In fact, many scholars have argued that the causal direction between trade and conflict may not necessarily be unidirectional—conflict could affect trade. Although no consensus has been reached regarding the relative strength of this reciprocal relationship, I chose to focus on the impact of interdependence on conflict, the causal direction that have been found to be stronger than that of conflict on interdependence (Barbieri, 2002). Having considered cautions against reciprocity in the interdependence–conflict nexus, I employ the dependent variable at time t and the explanatory variables at time t–1—except peace counter and spline variables—for each directed-dyad–year. Table 7 shows the results that are re-estimated with lagged independent variables.

The Models 3 and 4 show estimation results with logit and GEE estimations respectively. Coefficients of energy dependence variable in both estimations remain as negative and statistically significant, even though some substantive and statistical significance have been lost after employing lagged regressors. Sign and significance of control variables remain almost the same, except that of economic development variable. The higher economic growth of the potential initiator is statistically significantly associated with a lower likelihood of conflict initiation. This finding supports the argument that countries experiencing adverse economic shocks are more likely to initiate foreign conflict to divert attention away from domestic problems and engender rally-round-the-flag effect.

In recognition that energy relations are established upon long-term binding contracts, considering only the last year's figures while analyzing the impact of energy dependence may not truly reflect the nature of the relationship. That's why, in Models 5 and 6, I employ 3-year Moving Average of energy dependence figures and re-run the logit and GEE estimations, respectively. The results, again, bolster our argument that as energy dependence of a country increases, its propensity to initiate conflict against the supplier decreases. Different from the previous estimation results in control variables, being a democratic target increases the probability of engaging in a conflict.

Table 7: Energy Dependence and Militarized Interstate Dispute Initiation (Lagged IVs)

Independent Variables$_{(t-1)}$	(Model 3) Dispute Initiation$_{(t)}$	(Model 4) Dispute Initiation$_{(t)}$	(Model 5) Dispute Initiation$_{(t)}$	(Model 6) Dispute Initiation$_{(t)}$
Energy Dep. of Initiator	-1.302*	-1.349*		
	(-1.82)	(-1.74)		
Energy Dep. of Init. MA(3)			-1.626**	-1.773**
			(-2.33)	(-2.40)
Contiguous	3.129***	3.203***	3.025***	3.123***
	(20.55)	(20.53)	(18.91)	(19.07)
Initiator is a Democracy	0.102	0.113	0.125	0.133
	(0.78)	(0.84)	(0.96)	(0.98)
Target is a Democracy	0.226*	0.212	0.281**	0.276**
	(1.69)	(1.51)	(2.10)	(1.98)
Joint Democracy	-0.772***	-0.790***	-0.772***	-0.802***
	(-3.86)	(-3.77)	(-3.85)	(-3.81)
Initiator is a Major Power	0.653***	0.700***	0.685***	0.723***
	(3.71)	(3.88)	(3.86)	(3.98)
Target is a Major Power	0.791***	0.784***	0.783***	0.773***
	(3.29)	(3.13)	(3.22)	(3.03)
Both Major	-0.351	-0.268	-0.455	-0.378
	(-0.67)	(-0.51)	(-0.86)	(-0.70)
Relative Power of Initiator	0.673***	0.703***	0.652***	0.694***
	(3.66)	(3.69)	(3.51)	(3.60)
Trade Depend. of Initiator	0.839	0.811	1.097	1.122
	(0.91)	(0.90)	(1.10)	(1.16)
Econ. Growth of Initiator	-0.582*	-0.847**	-1.222***	-1.415***
	(-1.65)	(-2.24)	(-3.11)	(-3.42)
Foreign Policy Similarity	-0.952***	-0.987***	-0.892***	-0.930***
	(-4.45)	(-4.71)	(-4.25)	(-4.48)
Allied	0.351**	0.358**	0.320**	0.330**
	(2.55)	(2.47)	(2.35)	(2.29)
Peace Years	-0.240***	-0.207***	-0.248***	-0.214***
	(-12.78)	(-11.05)	(-12.77)	(-10.94)
Spline 1	2.047***	1.724***	2.134***	1.812***
	(7.23)	(6.24)	(7.52)	(6.47)
Spline 2	-6.863***	-5.820***	-7.303***	-6.281***
	(-5.35)	(-4.78)	(-5.68)	(-5.11)
Spline 3	-6.711	-7.013	-4.141	-4.433
	(-0.63)	(-0.84)	(-0.41)	(-0.55)
Constant	-4.642***	-4.946***	-4.486***	-4.820***
	(-19.55)	(-20.16)	(-18.39)	(-18.96)
Observations	531013	531013	505025	505025
Pseudo R^2	0.398		0.403	
Estimation	logit	xtgee	logit	xtgee
Test	Wald	Wald	Wald	Wald
Chi-squared	2851.9	2610.6	2886.0	2618.9
Log-likelihood	-3712.6		-3523.7	

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

As constitutive elements of overall energy dependence variable, dependence figures of four primary energy resources should also be analyzed. Availability of alternative sources and the ability to reach them is important to diversify and meet energy needs whereby states could mitigate the vulnerability caused by the dependence. As Tekin & Williams (2011) indicate, spot market opportunity in energy has become increasingly important to diversify needs of states. Out of four primary energy resources, oil and natural gas appear as the least fluid commodities in the spot market, and compared to the natural gas market, oil market appears to be more fluid (Tekin & Williams, 2011). The more fluid the market is, the harder the states diversify their energy needs, and hence, the more vulnerable they feel against their partners. Therefore, our expectation is to find the significant reducing effect of natural gas dependence on conflict initiation. Table 8 (logit model) and 9 (GEE model) show the estimations results based on resource types.

Along with my expectations, natural gas is the only energy resource dependence of which significantly reduces the likelihood of conflict initiation for a potential initiator. Control variables yield results like those in the previous estimations in terms of substantive and statistical significance. The only caveat I need to talk over is the variation in observation numbers, particularly for estimations of oil dependence: Could variation in observation numbers be a reason for such difference in dependence coefficients across models?

Table 8: Energy Dependence and Militarized Interstate Dispute Initiation (Logit Model by Resource Types)

Independent Variables$_{(t-1)}$	(Model 7) Dispute Initiation$_{(t)}$	(Model 8) Dispute Initiation$_{(t)}$	(Model 9) Dispute Initiation$_{(t)}$	(Model 10) Dispute Initiation$_{(t)}$
Coal Depend. of Initiator	-1.447			
	(-0.64)			
Oil Depend. of Initiator		-0.887		
		(-1.06)		
Natural Gas Dep. of Init.			-3.665*	
			(-1.72)	
Electricity Dep. of Initiator				-83.12
				(-1.54)
Contiguous	3.026***	2.542***	3.066***	3.006***
	(18.99)	(16.02)	(19.90)	(18.26)
Initiator is a Democracy	0.00265	0.0752	0.0865	0.0642
	(0.02)	(0.45)	(0.65)	(0.45)
Target is a Democracy	0.273*	0.260	0.207	0.266*
	(1.86)	(1.59)	(1.53)	(1.80)
Joint Democracy	-0.800***	-0.862***	-0.775***	-0.910***
	(-3.54)	(-3.90)	(-3.80)	(-3.99)
Initiator is a Major Power	0.646***	0.569***	0.602***	0.786***
	(3.26)	(2.98)	(3.26)	(4.04)
Target is a Major Power	0.864***	0.515**	0.898***	0.926***
	(3.63)	(2.10)	(3.64)	(3.50)
Both Major	-0.0939	0.0646	-0.270	-0.477
	(-0.17)	(0.13)	(-0.52)	(-0.82)
Relative Power of Initiator	0.708***	0.577***	0.669***	0.758***
	(3.57)	(2.58)	(3.53)	(3.77)
Trade Depend. of Initiator	0.282	0.732	0.569	1.065
	(0.34)	(0.80)	(0.61)	(1.03)
Econ. Growth of Initiator	-0.683*	-0.566	-0.810**	-1.024**
	(-1.86)	(-1.23)	(-2.24)	(-2.57)
Foreign Policy Similarity	-1.116***	-0.977***	-0.922***	-0.787***
	(-5.28)	(-4.16)	(-4.33)	(-3.64)
Allied	0.350***	0.495***	0.342**	0.302*
	(2.58)	(2.73)	(2.50)	(1.94)
Peace Years	-0.223***	-0.234***	-0.239***	-0.241***
	(-11.38)	(-9.95)	(-11.95)	(-11.58)
Spline 1	1.897***	2.166***	2.151***	2.007***
	(6.34)	(6.07)	(7.15)	(6.54)
Spline 2	-6.874***	-7.225***	-7.599***	-7.081***
	(-5.00)	(-4.44)	(-5.63)	(-5.18)
Spline 3	-0.272	-12.58	-0.570	0.233
	(-0.03)	(-0.62)	(-0.06)	(0.03)
Constant	-4.536***	-4.105***	-4.615***	-4.591***
	(-18.55)	(-13.69)	(-18.92)	(-17.92)
Observations	386515	208543	466287	425217
Pseudo R^2	0.376	0.356	0.392	0.393
Estimation	logit	logit	logit	logit
Test	Wald	Wald	Wald	Wald
Chi-squared	2226.6	1509.4	2538.2	2396.5
Log-likelihood	-3116.9	-2448.2	-3409.6	-3091.3

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9: Energy Dependence and Militarized Interstate Dispute Initiation (GEE Model by Resource Types)

Independent Variables$_{(t-1)}$	(Model 11) Dispute Initiation$_{(t)}$	(Model 12) Dispute Initiation$_{(t)}$	(Model 13) Dispute Initiation$_{(t)}$	(Model 14) Dispute Initiation$_{(t)}$
Coal Depend. of Initiator	-1.903			
	(-0.73)			
Oil Depend. of Initiator		-0.848		
		(-0.94)		
Natural Gas Dep. of Init.			-4.010*	
			(-1.76)	
Electricity Dep. of Initiator				-82.46
				(-1.60)
Contiguous	3.087***	2.622***	3.147***	3.058***
	(19.05)	(16.07)	(20.00)	(18.24)
Initiator is a Democracy	0.00666	0.107	0.107	0.0775
	(0.04)	(0.63)	(0.78)	(0.53)
Target is a Democracy	0.262*	0.264	0.195	0.253*
	(1.72)	(1.56)	(1.38)	(1.65)
Joint Democracy	-0.830***	-0.900***	-0.807***	-0.929***
	(-3.51)	(-3.83)	(-3.77)	(-3.97)
Initiator is a Major Power	0.691***	0.584***	0.654***	0.826***
	(3.44)	(2.99)	(3.47)	(4.18)
Target is a Major Power	0.850***	0.489*	0.897***	0.932***
	(3.40)	(1.90)	(3.50)	(3.39)
Both Major	-0.0523	0.230	-0.211	-0.439
	(-0.10)	(0.45)	(-0.39)	(-0.74)
Relative Power of Initiator	0.740***	0.632***	0.704***	0.777***
	(3.61)	(2.79)	(3.56)	(3.77)
Trade Depend. of Initiator	0.384	0.706	0.535	0.997
	(0.47)	(0.77)	(0.58)	(0.98)
Econ. Growth of Initiator	-0.896**	-0.942*	-1.076***	-1.225***
	(-2.27)	(-1.96)	(-2.80)	(-2.95)
Foreign Policy Similarity	-1.111***	-0.998***	-0.947***	-0.827***
	(-5.38)	(-4.30)	(-4.58)	(-3.85)
Allied	0.332**	0.500***	0.344**	0.324**
	(2.36)	(2.70)	(2.42)	(2.02)
Peace Years	-0.190***	-0.190***	-0.204***	-0.214***
	(-9.55)	(-8.24)	(-10.28)	(-10.37)
Spline 1	1.586***	1.700***	1.802***	1.771***
	(5.37)	(4.92)	(6.14)	(5.92)
Spline 2	-5.865***	-5.651***	-6.452***	-6.339***
	(-4.47)	(-3.66)	(-5.01)	(-4.89)
Spline 3	-0.915	-15.53	-2.041	0.0423
	(-0.12)	(-0.91)	(-0.27)	(0.01)
Constant	-4.847***	-4.505***	-4.940***	-4.821***
	(-18.94)	(-14.61)	(-19.67)	(-18.17)
Observations	386515	208543	466287	425217
Estimation	xtgee	xtgee	xtgee	xtgee
Test	Wald	Wald	Wald	Wald
Chi-squared	2009.3	1346.8	2332.4	2210.1

t statistics in parentheses

* p < 0.10, ** p < 0.05, *** p < 0.01

As Table 10 shows, the percentage of zeros in each resource-based dependence figures are over 90%, except that in oil dependence. While compiling energy dependence dataset, I corrected missing values in dyadic energy trade variable as zero if importer's total imports of a given resource or exporter's total exports of it are equal to zero. While the IEA database reports total export and import figures for around 140 countries, the EIA database does it for 228 countries. Therefore, the main reason for such a difference in oil dependence is the unavailability of monadic export and import data for oil in the EIA database whereby I could correct the missing values as zero for other primary resource types.

Table 10: Percentage of 0s in Resource Dependence Figure

	Total Observations	**Observations=0**	**Observations>0**	**Percentage of 0s**
Coal Dependence	703889	660470	43419	93.8%
Oil Dependence	288937	121639	167298	42.1%
Natural Gas Dependence	798524	788151	10373	98.7%
Electricity Dependence	781885	776497	5388	99.3%

To check whether our estimation results showing the impact of oil dependence on conflict initiation at Model 8 and 12 are a statistical artifact due mainly to not reported zero dependencies, I recode missing values in oil dependence as zero if the natural gas dependence of a given country is equal to zero and re-run the estimations. Although it is not an ideal solution, this operation raises the percentage of zero dependence figures for oil to 80%. The re-estimation results are reported in Table 11. Model 15 and 16 show no significant changes in coefficients implying that what I found in Model 8 and 12 are not statistical artifacts.

Table 11: Oil Dependence and Militarized Interstate Dispute Initiation

Independent Variables$_{(t-1)}$	(Model 15) Initiation$_{(t)}$	(Model 16) Initiation$_{(t)}$
Oil Depend. of Initiator	-0.835	-0.895
	(-1.01)	(-0.97)
Contiguous	3.059***	3.139***
	(20.13)	(20.14)
Initiator is a Democracy	0.111	0.123
	(0.83)	(0.90)
Target is a Democracy	0.215	0.195
	(1.59)	(1.38)
Joint Democracy	-0.783***	-0.804***
	(-3.88)	(-3.79)
Initiator is a Major Power	0.665***	0.719***
	(3.75)	(3.96)
Target is a Major Power	0.755***	0.744***
	(3.13)	(2.95)
Both Major	-0.322	-0.231
	(-0.62)	(-0.44)
Relative Power of Initiator	0.651***	0.686***
	(3.45)	(3.51)
Trade Depend. of Initiator	0.817	0.804
	(0.86)	(0.87)
Econ. Growth of Initiator	-0.792**	-1.076***
	(-2.21)	(-2.83)
Foreign Policy Similarity	-0.965***	-1.003***
	(-4.53)	(-4.80)
Allied	0.361**	0.366**
	(2.57)	(2.48)
Peace Years	-0.239***	-0.202***
	(-12.48)	(-10.64)
Spline 1	2.078***	1.716***
	(7.18)	(6.07)
Spline 2	-6.984***	-5.802***
	(-5.34)	(-4.66)
Spline 3	-7.321	-8.470
	(-0.67)	(-0.94)
Constant	-4.572***	-4.902***
	(-19.16)	(-19.84)
Observations	488539	488539
Pseudo R2	0.395	
Estimation	logit	xtgee
Test	Wald	Wald
Chi-squared	2660.9	2420.3
Log-likelihood	-3609.5	

t statistics in parentheses

* p < 0.10, ** p < 0.05, *** p < 0.01

The last analysis of this subsection is to investigate whether energy dependence is effective in reducing the likelihood of escalation for disputes initiated. Theoretically, in a directed-dyadic design, escalating behavior is expected from the target, the side who incurs hostile action from the initiator. In such a design where the direction of action is important, the direction of escalating actions should be from the target to the initiator. Out of many escalation operationalizations, the one that we could identify direction is that whether the target reciprocates the initiated disputes with any militarized action. Unlike the previous models, I now employ energy dependence of the target as my main explanatory variable of interest. I expect a negative and statistically significant coefficient for this variable. Table 12 reports the results of escalation analyses.

The results confirm my expectation that as energy dependence of the target to the potential initiator increases, the likelihood that the target reciprocates the initiator significantly decreases. Therefore, I can definitely say that energy dependence is a factor making states think twice before either initiate or escalate militarized disputes. Apart from energy dependence, major powers seem to refrain from escalating disputes with each other. Contiguity and alliance variables exacerbate the escalation likelihood.

Table 12: Energy Dependence and Militarized Interstate Dispute Escalation by Target

Independent Variables$_{(t-1)}$	(Model 17) Reciprocated$_{(t)}$	(Model 18) Reciprocated$_{(t)}$
Energy Depend. of Target	-2.546*	-2.330*
	(-1.94)	(-1.78)
Contiguous	0.862***	0.854***
	(3.99)	(3.96)
Initiator is a Democracy	-0.0367	-0.0345
	(-0.13)	(-0.13)
Target is a Democracy	0.134	0.0753
	(0.56)	(0.31)
Joint Democracy	-0.464	-0.516
	(-1.10)	(-1.23)
Initiator is a Major Power	0.498*	0.443
	(1.65)	(1.47)
Target is a Major Power	0.384	0.452
	(1.17)	(1.38)
Both Major	-1.068**	-1.042**
	(-2.19)	(-2.12)
Relative Power of Target	-0.208	-0.189
	(-0.56)	(-0.52)
Trade Depend. of Target	-1.535	-1.650
	(-1.16)	(-1.16)
Econ. Growth of Target	0.516	0.449
	(0.90)	(0.84)
Foreign Policy Similarity	0.168	0.214
	(0.71)	(0.92)
Allied	0.366*	0.367*
	(1.84)	(1.80)
Constant	-1.047***	-1.119***
	(-3.21)	(-3.54)
Observations	815	815
Pseudo R2	0.039	
Estimation	logit	xtgee
Test	Wald	Wald
Chi-squared	39.38	38.54
Log-likelihood	-531.2	

t statistics in parentheses

* p < 0.10, ** p < 0.05, *** p < 0.01

Since I employ binary dependent variable and estimate with logit technique, reporting marginal and substantive effects would help us interpret the effect energy dependence more conveniently. Table 13 reports marginal and substantive effects of the main independent variables passing the threshold of statistical significance.

Table 13: Marginal and Substantive Effects

Independent Variables$_{(t-1)}$	(Model 3) Dispute Initiation$_{(t)}$	Marginal Effect	Substantive Effect
Energy Dep. of Initiator	-1.302*	-.0018*	-5.33%
	(-1.82)	(-1.80)	(-9.91, -0.84)
Independent Variables$_{(t-1)}$	(Model 9) Dispute Initiation$_{(t)}$	Marginal Effect	Substantive Effect
Natural Gas Dep. of Init.	-3.665*	-.0052942*	-2.8%
	(-1.72)	(-1.71)	(-5.6, -0.00)
Independent Variables$_{(t-1)}$	(Model 17) Reciprocated$_{(t)}$	Marginal Effect	Substantive Effect
Energy Depend. of Target	-2.546*	-.578*	-8%
	(-1.94)	(-1.94)	(-15.2, -1.4)

Results in Table 13 shows that one unit increase in energy dependence of the initiator to the target leads to 0.18 percentage point decrease in the probability of dispute initiation. This effect becomes much stronger for the natural gas dependence: one unit increase in the natural gas dependence results in 0.53 percentage point decrease in the probability of dispute initiation. By definition, dependence figures cannot exceed one, and thus, the one-unit increase may not make sense while interpreting the results. Therefore, I also calculate substantive effects for the same variables of interest. One-standard-deviation increase in energy dependence of the initiator leads to 5.3% decrease in the existing probability of the dispute initiation. The impact of the natural gas dependence can be interpreted in the same way: one-standard-deviation increase in the natural gas dependence of the initiator leads to 2.8% decrease in the existing probability of the dispute initiation. When we look at the impact of the target's energy dependence on its probability of reciprocation against the initiator, one unit increase in the dependence results in 53 percentage point decrease in the probability of reciprocation. Likewise, one-standard-deviation increase in the dependence of the target leads to 8% decrease in the existing probability of reciprocation.

6.3.Energy Interdependence and Conflict Occurrence and Escalation

In this section, I examine whether pairs of countries that are highly interdependent on each other in terms of energy are less likely than other pairs of countries to engage in MIDs. Moreover, I probe the impact of energy interdependence on another characteristic of MIDs beyond the onset of the conflict—the escalation. Whether increasing interdependence in

energy within pairs of states associated with higher or lower probability of escalation is the main focus of this section.

Unlike the design I used for my analyses in the previous subsection, I will employ non-directed-dyad–year as my unit of analysis for the following analyses. The reason is that I now investigate the conditions associated with the occurrence of a dispute within a dyad, not the conditions influencing the decision of one state to initiate a dispute against another. Put differently, I do not prioritize the analyses regarding behaviors of countries vis-à-vis their partners, but the likelihood of observing conflict, or dispute onset, within a given dyad. Correspondingly, while employing a covariate in these analyses, I need to include information from both parties in a dyad. Instead of using one-sided, for instance, energy dependence figures, I will employ energy interdependence measure as my variable of interest while investigating the determinants of dispute onset.

6.3.1. Dependent Variable

While coding MID onsets, I rely on the following prescription: If a dyad (e.g. Turkey and Russia) experiences an outbreak of a MID in a given year, then that year is coded with a value of one for that dyad, and with a value of zero otherwise. MIDs with multi-disputants are disaggregated based on disputants and the side they belong to, and these disputants are matched separately in a dyadic form with each member of the opponent side. Only the first year of MIDs for a given dyad are taken into consideration as onsets, and if multiple MIDs are observed in a year for a given dyad, I consider only the most serious one—the MID reaching the highest hostility level. Such an adjustment in data is necessary; because the estimations that I will employ assume that the events being investigated are independent of each other.

6.3.2. Independent Variable

The main independent variable of interest is basically the energy interdependence within a dyad. Since I am interested in the analyses regarding the likelihood of observing conflict (or dispute onset) within a given dyad, my new variable should account for dependence information from both members of the dyad. To generate a dyadic measure of energy interdependence, I have two widely utilized alternatives—Oneal and Russett's (1997) weak-

link approach or Barbieri's (1996) interdependence formulation. Both approaches use dyadic dependence figures of one state to another to generate an interdependence measure.

Oneal & Russett (1997) employ the weak-link approach and identify the lower dependence score within a dyad as an interdependence measure. The weakest link approach assumes that the less dependent side defines the conflict propensity within the dyad. As Barbieri & Peters II (2003) warn, that kind of operationalization ignores the motivation or power of the more dependent state to influence the relationship. Giving credit to their warnings, I rely on the formulation proposed by Barbieri (1996) to measure dyadic interdependence. Using dyadic energy dependence figures, I respectively calculate dyadic measures of salience, symmetry, and interdependence, all of which conform to a uniform scale that ranges from 0 to 1. Dyadic salience, calculated as a geometric mean of two states' energy dependencies, gauges the extent to which partners are reciprocally dependent upon each other in the energy relationship: high salience means the relationship is important for each partner.

$$Salience_{ij,m,t} = \sqrt{ED_{ij,m,t} \times ED_{ji,m,t}}$$

where $ED_{ij,m,t}$ is energy dependence of country i to country j for energy resource m at year t and $ED_{ji,m,t}$ is energy dependence of country j to country i for energy resource m at year t. Symmetry is measured by one minus the absolute value of the difference in energy dependencies of parties constituting the dyad. According to Barbieri, the symmetry is described as the equality in dependence figures between partners: higher symmetry scores indicates balanced dependence.

$$Symmetry_{ij,m,t} = 1 - \left|ED_{ij,m,t} - ED_{ji,m,t}\right|$$

Finally, a measure of interdependence is created as the interaction of two dimensions of economic linkages—salience and symmetry. Barbieri aims to assign a high value to interdependence when both the extent and balance of dependence are high. Salience, symmetry, and interdependence have a range of values between zero and one.

$$Interdependence_{ij,m,t} = Salience_{ij} \times Symmetry_{ij}$$

This formulation calculates four different energy interdependence variables with respect to four primary energy resources—coal, oil, natural gas, and electricity. To generate overall

energy interdependence variable, I simply use the overall energy dependence figures—as a total of four resource-dependencies—and re-calculate salience, symmetry, and interdependence measure respectively. I expect a negative impact of energy interdependence on conflict onset and escalation.

6.3.3. Control Variables

While making the empirical analyses estimating the effect of energy interdependence on the likelihood of dyadic disputes, controlling for the usual suspects that may influence our independent variable, dependent variable or both is critical. Otherwise, these analyses do suffer heavily by omitted variable bias, and thus, the relationship that I present based on these analyses could be spurious. In my analyses, I will control for the following factors: contiguity, joint democracy, power preponderance, joint major power status, trade interdependence, dyadic economic development levels, dyadic foreign policy similarities, alliance ties, and temporal dependence.

Contiguity: Being contiguous increases not only the volume of mutual trade between countries (Arad & Hirsch, 1981), but also the likelihood of intense conflicts (Bremer, 1992; Goertz & Diehl, 1992; Vasquez & Henehan, 2001). Underlying arguments explain the relationship between a geographical proximity and conflict by referring to the contact theory—conflicts of interest are observed more likely between countries having frequent levels of contact (Waltz, 1979)—or the issue salience—geographical proximity may lead to conflicts related to severer issues more frequently between countries, such as territorial issues (Goertz & Diehl, 1992). Similar arguments might also remain valid for trade–conflict nexus: higher levels of interaction led by trade might trigger conflicts over a trading relationship or other issues.

I use Stinnett et al.'s (2002) "Contiguity" definition to generate a binary variable which is equal to one if the dyad members are directly contiguous or separated by fewer than 125 miles of water. I expect a positive impact of contiguity on conflict initiation.

Joint Democracy: Regime types of countries appear as an important factor to control while estimating the relationship between interdependence and conflict. A law-like theory of democratic peace has been empirically verified so many times: democracies do no fight with

one another (Maoz & Abdolali, 1989; Maoz & Russett, 1993; Morgan & Campbell, 1991; Morgan & Schwebach, 1992; Ray, 1995, 1998). Owing to differences in domestic political institutions (i.e. elections, audience cost), democracies may diverge from autocracies in a way to refrain from engaging in a conflict straightforwardly. Apart from affecting conflict tendencies of countries, especially similarity in regime types has been conceived to affect trading relationships in a positive direction (Dixon & Moon, 1993; Polachek, 1997).

I use data from Polity IV (Jaggers & Gurr, 1995) to operationalize regime types of countries, which comprises scaled information of countries' democracy levels. I identify a regime type of a given country as a democracy if the country has a Polity score (democracy score–autocracy score) of six or greater. Then, I generate a binary variable of "Joint Democracy" if both dyad members are democracy.

Power Preponderance: The relationship between relative power and conflict has been discussed by many theorists and divergent positions among them have emerged; whether power preponderance or a balance of power leads to peaceful relationship remains as an empirical question (Morgenthau, 1963; Organski & Kugler, 1980). Empirical studies investigating dyadic relationship between countries show that power preponderance, not a balance of power, is conducive to promoting peace (Bremer, 1992; Kugler & Lemke, 1996).

To operationalize power preponderance level in a given dyad, I use the COW Composite Index of National Capabilities (CINC) dataset. This dataset provides a composite index (CINC) score including salient factors contributing nationals power of a state, such as military spending, military personnel, iron and steel production, total population, urban population, and total primary energy consumption. CINC score ranges from zero to one. Using CINC score, I calculate power preponderance as the share of dyadic capabilities possessed by the stronger member of the dyad (Singer, 1988). The values of the variable, thus, are bounded between 0.5 and one, where 0.5 indicates that perfect equality within the dyad whereas 1 indicates that the stronger state preponderates its power.

Power Statuses of States: Whether a state is a major or minor power is another factor that may influence conflict tendencies. According to the literature, major powers are expected to be more likely to involve in MIDs (Bremer, 1992). Based on Small and Singer's (1982) list indicating Major Powers—the U.S., the U.K., Russia, China, Japan, Germany, and France—

, Major Power status of states is coded as 1, and 0 otherwise. "Both Major" variable is equal to 1 when both members of a dyad are Major Powers.

Alliances: Alliance ties may affect both the likelihood of observing conflict within a dyad and the level of trade between states. Scholarly studies hypothesize that alliance ties make conflict between states less likely. Although such a hypothesis lacks firm theoretical and empirical agreement (Bueno de Mesquita, 1981; Bremer, 1992; Maoz & Russett, 1993), many empirical studies have included a variable corresponding to formal security alliances in their models of conflict initiation and onset (Braithwaite & Lemke, 2011). Besides having influence the conflict proneness within a dyad, alliance ties may also affect the level of trade between state—states are more likely to trade with their allies (Gowa, 1994). To operationalize interstate alliance, I use Gibler and Sarkees's (2004) defense pacts data. "Allied" is a dichotomous variable equal to one if states have a defense pact with one another. Defense pacts indicate whether parties of the dyad both join in a treaty of alliance providing security guarantees of mutual assistance in the incidence either party is attacked. This type of alliance is the highest degree of common security interests which is very powerful to make parties avoid conflict and escalation.

Foreign Policy Similarity: Since a conflict of interest between states is one of the main reasons for them to engage in a dispute, the extent to which their international interests are in compliance with one another may also affect conflict propensities within a dyad. Conflict is presumed to be less likely between countries having agreed on major issues in their foreign policies (Bueno de Mesquita, 1981; Gartzke, 1998). To operationalize foreign policy similarity, I use Hage's (2017) FPSIM (Foreign Policy Similarity) Dataset v2.0. This dataset includes several similarity scores—unweighted or weighted (with respect to capabilities)—and all these scores use either the similarity in alliance portfolios (Bueno de Mesquita, 1981; Signorino & Ritter, 1999) or the similarity in United Nations General Assembly (UNGA) voting patterns (Voeten, 2013) of states as their basis for the operationalization. In my analyses, I rely on UNGA voting similarity scores to proxy foreign policy similarity within dyads. Each similarity score ranges from -1 to 1; larger numbers indicate greater similarity in international interests.

Trade Interdependence: Motivated by optimistic arguments of classical liberal, scholars

have empirically investigated the pacifying effect of trade interdependence on interstate conflict. Although some scholars have demonstrated the conflict-promoting impact of this type of interdependence within dyads (Barbieri, 1996), a number of studies have confirmed that trade interdependence decreases the likelihood of engaging in militarized disputes (Oneal & Russett, 1997; Polachek, 1980; Gasiorowski, 1986). The more extensive trade ties that pairs of states have, the higher expected cost of conflict that partners would incur. To measure trade interdependence, I rely on Correlates of War (COW) Project Trade Dataset v4.0 (Barbieri et al., 2009).

Dyadic trade interdependence needs calculation of trade dependence figures of each member of a dyad. Trade dependence of a country on its partner is calculated based on total dyadic trade—imports and exports—as a share of total trade (Oneal & Russett, 1997). To generate a dyadic measure of trade interdependence out of these dependence figures, Oneal & Russett (1997) employ the weak-link approach and identify the lower dependence score within a dyad as a trade interdependence variable. The weakest link approach assumes that the less dependent side defines the conflict propensity within the dyad. As Barbieri & Peters II (2003) warn, that kind of operationalization ignores the motivation or power of the more dependent state to influence the relationship. Therefore, I calculate the trade interdependence measure by relying on Barbieri (1996). First, I calculate the trade share of each member of a dyad as the proportion of dyadic trade flows—both import and export flows—over total trade. These trade shares are used to calculate dyadic measures of salience, symmetry, and interdependence, which conform to a uniform scale that ranges from 0 to 1. Dyadic salience, calculated as a geometric mean of two states' trade shares, gauges the extent to which trade partners are reciprocally dependent upon each other in a trade relationship: high salience means the relationship is important for each partner. Symmetry is measured by one minus the absolute value of the difference in trade shares of parties composing the dyad. According to Barbieri, the symmetry is described as the equality in energy dependence figures between partners: higher symmetry scores indicates balanced interdependence. Finally, a measure of interdependence is created as the interaction of two dimensions of economic linkages—salience and symmetry. Barbieri aims to assign a high value to interdependence when both the extent and balance of dependence are high. Salience, symmetry, and interdependence have a range of values between zero and one.

Economic Development: Economic development levels of states may affect both conflict likelihood between states and their trading relationship. As countries' economic development figures increases, they might refrain from involving in militarized disputes to not sacrifice their current economic welfare. On the contrary, countries suffering from adverse economic shocks may tend to involve in interstate conflicts in order to turn attention away from domestic problems (Ostrom & Job, 1986).

Moreover, economic development may influence trading patterns between states: a state with relatively higher economic development could be deemed as a primary producer of value-added products—the products that other states may, most probably, need. Relying on Reed's (2000) operationalization of economic development and using Gleditsch's (2002) Expanded GDP Dataset v6.0, I calculate economic development variable of a given country as an annual percentage change in real GDP per capita figures. For dyadic economic development measure, I rely on the weak-link approach and consider the lower value of economic development within a dyad.

Temporal Dependence: While estimating the impact of energy interdependence on the likelihood of militarized disputes that partners might engage in, I employ logistic regression. Like in ordinary least squares (OLS) regression model, logistic regression models have an assumption that events are independent of one another. In the real world, however, the outbreak of one militarized dispute might trigger others prospectively. Conversely, quite long non-event period might reduce the probability of event occurrence; prolonged peace may induce further peace. Since militarized disputes are relatively rare events and most of the binary observations in the dependent variables are zero, failing to control for temporal dependence leads to biased estimates. Therefore, to make sure that my estimation results are free of bias, I need to control for temporal dependence between events—in my case they are militarized disputes.

Beck et al. (1998) suggest that temporal dependence in logistic regression models with binary dependent variables can be controlled by including a variable that counts the number of years since partners were last involved in a militarized dispute—named peace-years. Therefore, I include peace-years variable as well as its cubic polynomial specification

as Carter & Signorino (2010) suggest. The peace-years variable is expected to be negatively correlated with militarized dispute occurrence.[28]

For the econometric analyses of determinants of the onset likelihood, I employ logit—the most commonly used estimation technique for models having dichotomous dependent variables. Traditional logit model, however, assumes that events are independent of each other, which is inappropriate for a time-series cross-section (panel) dataset. Since my dataset consists of iterated observations, and maybe events, of the same dyads over time as well as observations of myriad dyads in the same year, traditional logit model might suffer from both cross-sectional and inter-temporal correlation in the error terms. To fix this problem, I corrected standard errors based on dyadic groups. With this correction, standard errors now allow for intra-group correlation, which in fact relaxes the assumption that the events are independent. That is, the events are independent across groups (clusters), but not necessarily within groups.

To check the robustness of my estimates I replicate all model with a generalized estimating equation (GEE) estimation. As a direct extension of the Generalized Linear Model (GLM), GEE is a quasi-likelihood method providing information about the relationship between the expected value of the dependent variable and the covariates in the context of panel data. GEE estimation is proposed to properly examine differences among groups identified by specific characteristics (Zorn, 2001). Since I want to estimate how variance in energy dependence affects the average probability of dispute initiation across the population, GEE aptly serves my needs. I again correct the standard errors for heteroskedasticity among clusters (dyadic groups) and correct for autocorrelation using a common rho estimated from the data. My only criterion to include dyads in these analyses is based on the availability of data for the members of the dyad and for dyadic interactions and energy trade.

[28] I am aware of the possible endogeneity problem between peace years and interdependence. In fact, the probability of involving in a conflict may be lower for pairs of states having long history of interdependence. We might still expect a difference in the likelihoods of future conflict between dyads having long history of interdependence and those having never been interdependent although they both have experienced a dispute recently. Controlling for peace years does not consider such possibility; because the logic behind using this variable assumes that the number of years elapsed since the last dispute is independent of other covariates included in the analysis (Beck et al., 1998). Therefore, peace years variable is apt to be a function of interdependence (Oneal, 2003).

6.3.4. Results

Table 14: Energy Interdependence and Militarized Interstate Dispute Occurrence

Independent Variables$_{(t)}$	(Model 19) Onset$_{(t)}$	(Model 20) Onset$_{(t)}$
Energy Interdependence	-4.611	-5.250
	(-1.39)	(-1.61)
Contiguous	2.887***	3.012***
	(16.49)	(16.48)
Joint Democracy	-0.493***	-0.506***
	(-3.16)	(-3.23)
Both Major	0.799*	0.901*
	(1.78)	(1.90)
Power Preponderance	0.0234	-0.00427
	(0.06)	(-0.01)
Trade Interdependence	5.504**	5.240*
	(2.01)	(1.91)
Economic Development	1.047**	0.643
	(2.24)	(1.38)
Foreign Policy Similarity	-1.262***	-1.280***
	(-4.40)	(-4.61)
Allied	0.217	0.222
	(1.52)	(1.47)
Peace Years	-0.291***	-0.253***
	(-13.15)	(-11.90)
Spline 1	2.601***	2.241***
	(7.53)	(6.84)
Spline 2	-9.254***	-8.094***
	(-5.99)	(-5.65)
Spline 3	7.029	6.247
	(0.82)	(0.97)
Constant	-3.083***	-3.392***
	(-8.30)	(-8.97)
Observations	272231	272231
Pseudo R2	0.442	
Estimation	logit	xtgee
Test	Wald	Wald
Chi-squared	2142.3	2012.4
Log-likelihood	-3081.6	

t statistics in parentheses

* p < 0.10, ** p < 0.05, *** p < 0.01

Table 14 shows logit (Model 19) and GEE (Model 20) estimation results, respectively. Both models indicate that as energy relationship gets more extensive within a dyad, the MID occurrence becomes less likely. The coefficients, however, are not statistically significant. When we look at the control variables, contiguity remains as one of the strongest predictors

of dyadic conflict: geographical proximity is highly conducive to a conflictual relationship. Jointly democratic dyads are less likely to engage in MIDs which upholds the law-like theory of democratic peace. Major powers seem more likely to engage in dyadic conflicts. The similarity in foreign policy preferences associates negatively with the likelihood of onset. The peace years variable, which is negative and statistically significant as expected, suggests that pairs of states with prolonged peace are less likely to involve in another dyadic dispute. The spline variables indicate that the temporal dependence between observations diminishes as the peace counter increases.

The most interesting result worth discussing is the positive impact of trade interdependence on the likelihood of MID onset—extensive trade ties lead to a more conflictual relationship. This finding is quite opposite of what the liberal school has argued and expected. Our results confirmed the realists who defend the claim that trade leads to conflict. In fact, this finding is congruent with Barbieri's (1996, 2002) conclusion. The discrepancy in findings regarding the impact of energy and trade dependencies partly the importance of marking out types of interdependence while analyzing the interdependence–interstate relations nexus. Even after controlling for trade interdependence, we observe the pacifying effect of energy interdependence in interstate relations despite the fact that the results are not statistically significant.

The results reported at Table 14 are based on estimations between the dependent variable and independent variables at time t. Considering the reciprocal nature of the interdependence–conflict relationship, using lagged independent variables might be required. In fact, many scholars have argued that the causal direction between trade and conflict may not necessarily be unidirectional—conflict could affect trade. Although no consensus has been reached regarding the relative strength of this reciprocal relationship, I chose to focus on the impact of interdependence on conflict, the causal direction that have been found to be stronger than that of conflict on interdependence (Barbieri, 2002). Having considered cautions against reciprocity in the interdependence–conflict nexus, I employ the dependent variable at time t and the explanatory variables at time t–1—except peace counter and spline variables—for each non-directed-dyad–year and re-run the estimations. Table 15 shows the results with lagged independent variables.

Table 15: Energy Interdependence and Militarized Interstate Dispute Occurrence (Lagged IVs)

Independent Variables$_{(t-1)}$	(Model 21) Onset$_{(t)}$	(Model 22) Onset$_{(t)}$	(Model 23) Onset$_{(t)}$	(Model 24) Onset$_{(t)}$
Energy Interdependence	-3.630	-3.633		
	(-1.39)	(-1.45)		
Energy Interdependence MA(3)			-5.610*	-6.031*
			(-1.81)	(-1.93)
Contiguous	2.706***	2.855***	2.604***	2.770***
	(15.12)	(15.17)	(14.03)	(14.12)
Joint Democracy	-0.483***	-0.508***	-0.383**	-0.422**
	(-2.87)	(-2.93)	(-2.32)	(-2.46)
Both Major	0.759*	0.861*	0.603	0.687
	(1.69)	(1.79)	(1.36)	(1.43)
Power Preponderance	0.0726	0.0463	0.0978	0.0653
	(0.18)	(0.11)	(0.24)	(0.16)
Trade Interdependence	6.113**	5.853**	7.709***	7.660***
	(2.17)	(2.11)	(2.62)	(2.65)
Economic Development	0.335	-0.0608	-0.686	-0.953**
	(0.77)	(-0.14)	(-1.56)	(-2.14)
Foreign Policy Similarity	-1.195***	-1.236***	-1.163***	-1.209***
	(-4.34)	(-4.53)	(-4.35)	(-4.51)
Allied	0.194	0.204	0.137	0.147
	(1.40)	(1.39)	(0.97)	(0.98)
Peace Years	-0.304***	-0.263***	-0.307***	-0.266***
	(-13.11)	(-11.69)	(-12.89)	(-11.40)
Spline 1	2.794***	2.402***	2.823***	2.441***
	(7.96)	(7.20)	(8.05)	(7.28)
Spline 2	-10.10***	-8.843***	-10.32***	-9.104***
	(-6.52)	(-6.21)	(-6.69)	(-6.38)
Spline 3	10.34	9.594*	11.66*	10.72**
	(1.42)	(1.84)	(1.76)	(2.19)
Constant	-2.957***	-3.295***	-2.900***	-3.235***
	(-7.72)	(-8.32)	(-7.56)	(-8.11)
Observations	261608	261608	251028	251028
Pseudo R2	0.445		0.449	
Estimation	logit	xtgee	logit	xtgee
Test	Wald	Wald	Wald	Wald
Chi-squared	2264.7	2080.8	2206.0	2033.8
Log-likelihood	-2958.7		-2815.7	

t statistics in parentheses

* p < 0.10, ** p < 0.05, *** p < 0.01

Models 21 and 22 show estimation results with logit and GEE estimations, respectively. Coefficients of energy interdependence variable in both estimations remain

negative, but they still fail to reach statistical significance. Sign and significance of the control variables remain almost the same as in the previous estimations. Considering that energy relations are established upon long-term binding contracts, I employ 3-year Moving Average of energy interdependence figures and re-run the logit and GEE estimations, respectively. Models 23 and 24 show the results—higher levels of energy interdependence, again, decreases the likelihood of MID onset and the coefficients are now statistically significant.

Recalling Tekin and Williams's (2011) argument on differences in market dynamics of resource types, which may affect the chance of diversification in meeting a need, I also re-estimate models based on four different types of primary energy resources. My expectation is, again, to find the significant reducing effect of natural gas dependence on MID onset. Table 16 (logit models) and 17 (GEE models) show the estimations results based on resource types.

Table 16: Energy Interdependence and Militarized Interstate Dispute Occurrence (Logit Models by Resource Types)

Independent Variables$_{(t-1)}$	(Model 25) Onset$_{(t)}$	(Model 26) Onset$_{(t)}$	(Model 27) Onset$_{(t)}$	(Model 28) Onset$_{(t)}$
Coal Interdependence	-215.0*			
	(-1.68)			
Oil Interdependence		-2.227		
		(-1.01)		
Natural Gas Interdepend.			-152.5***	
			(-3.41)	
Electricity Interdepend.				-297.6
				(-1.20)
Contiguous	2.653***	2.248***	2.666***	2.572***
	(14.54)	(11.14)	(14.80)	(13.98)
Joint Democracy	-0.525***	-0.558***	-0.414***	-0.550***
	(-2.82)	(-2.97)	(-2.60)	(-2.93)
Both Major	0.909*	0.697	0.764*	0.984*
	(1.93)	(1.58)	(1.73)	(1.96)
Power Preponderance	0.119	-0.347	0.132	0.266
	(0.30)	(-0.75)	(0.33)	(0.62)
Trade Interdependence	6.958**	4.491	6.649***	8.249***
	(2.50)	(1.29)	(2.63)	(2.63)
Economic Development	0.0720	0.0220	0.184	0.0227
	(0.17)	(0.04)	(0.42)	(0.05)
Foreign Policy Similarity	-1.217***	-1.296***	-1.225***	-1.111***
	(-4.29)	(-4.42)	(-4.51)	(-4.26)
Allied	0.218	0.407**	0.242*	0.181
	(1.58)	(2.36)	(1.81)	(1.17)
Peace Years	-0.281***	-0.302***	-0.301***	-0.307***
	(-12.02)	(-11.28)	(-12.80)	(-12.69)
Spline 1	2.453***	2.832***	2.827***	2.744***
	(6.88)	(6.68)	(7.85)	(7.47)
Spline 2	-9.141***	-9.516***	-10.36***	-9.970***
	(-5.69)	(-5.14)	(-6.50)	(-6.15)
Spline 3	10.91*	3.632	11.74*	11.54*
	(1.86)	(0.31)	(1.78)	(1.89)
Constant	-3.045***	-2.159***	-3.025***	-3.007***
	(-8.13)	(-5.06)	(-7.91)	(-7.34)
Observations	223270	98846	249309	225747
Pseudo R2	0.429	0.417	0.442	0.440
Estimation	logit	logit	logit	logit
Test	Wald	Wald	Wald	Wald
Chi-squared	2059.1	1100.5	2202.4	1805.0
Log-likelihood	-2590.7	-1847.6	-2823.0	-2561.1

t statistics in parentheses

* p < 0.10, ** p < 0.05, *** p < 0.01

Table 17: Energy Interdependence and Militarized Interstate Dispute Occurrence (GEE Model by Resource Types)

Independent Variables$_{(t-1)}$	(Model 29) Onset$_{(t)}$	(Model 30) Onset$_{(t)}$	(Model 31) Onset$_{(t)}$	(Model 32) Onset$_{(t)}$
Coal Interdependence	-182.2 (-1.58)			
Oil Interdependence		-3.204 (-1.32)		
Natural Gas Interdepend.			-129.0*** (-2.99)	
Electricity Interdepend.				-284.1 (-1.30)
Contiguous	2.758*** (14.58)	2.422*** (11.39)	2.826*** (14.93)	2.671*** (13.88)
Joint Democracy	-0.561*** (-2.91)	-0.585*** (-2.99)	-0.452*** (-2.70)	-0.578*** (-2.99)
Both Major	0.955* (1.92)	0.769 (1.62)	0.884* (1.84)	1.046** (2.00)
Power Preponderance	0.0743 (0.18)	-0.511 (-1.08)	0.0791 (0.19)	0.228 (0.52)
Trade Interdependence	6.741** (2.38)	4.585 (1.37)	6.016** (2.32)	8.205*** (2.59)
Economic Development	-0.176 (-0.41)	-0.515 (-1.00)	-0.192 (-0.44)	-0.253 (-0.52)
Foreign Policy Similarity	-1.229*** (-4.39)	-1.349*** (-4.51)	-1.240*** (-4.62)	-1.169*** (-4.47)
Allied	0.196 (1.37)	0.399** (2.17)	0.235* (1.66)	0.193 (1.21)
Peace Years	-0.250*** (-10.91)	-0.252*** (-9.58)	-0.258*** (-11.30)	-0.278*** (-11.61)
Spline 1	2.163*** (6.34)	2.296*** (5.57)	2.410*** (7.06)	2.483*** (7.02)
Spline 2	-8.195*** (-5.48)	-7.754*** (-4.34)	-9.020*** (-6.17)	-9.147*** (-6.03)
Spline 3	9.784* (1.95)	-0.297 (-0.03)	10.52** (2.09)	10.87** (2.19)
Constant	-3.279*** (-8.47)	-2.433*** (-5.50)	-3.363*** (-8.50)	-3.220*** (-7.64)
Observations	223270	98846	249309	225747
Estimation	xtgee	xtgee	xtgee	xtgee
Test	Wald	Wald	Wald	Wald
Chi-squared	1908.6	1016.1	2020.1	1684.8

t statistics in parentheses

* p < 0.10, ** p < 0.05, *** p < 0.01

Along with my expectations, coefficients that belong to natural gas interdependence appear as the most significant one compared to those belonging to other primary resources.

Natural gas interdependence significantly reduces the likelihood of conflict onset within dyads. Unexpectedly, coal interdependence is found significant in the logit model. Whether such an unexpected finding could be a statistical artifact might be evaluated by looking at the results of the GEE model in which coal interdependence variables lose its significance. Both logit and GEE results confirm the pacifying impact of natural gas interdependence on conflict onset. Control variables yield results like those in the previous estimations in terms of substantive and statistical significance.

To investigate the dynamics of escalation after the onset, the unified model is suggested by Reed (2000). The reason for such a model suggestion is the selection issue that may emerge in processes of onset and escalation. Selection of events has always been a critical issue in studies of conflict and escalation (Morrow, 1989; Most & Starr, 1989). While investigating the determinants of escalation, studied have treated non-onset cases as omitted observations. A typical empirical application has been that cases with onset are identified first, and then cases that escalate or do not escalate are differentiated in estimations. Such an application introduces no bias if the factors causing onset and escalation are not correlated. If, however, the covariates of onset and escalation are correlated, then the non-onset cases must be considered while making an estimation. Bias generated by the selection of cases based on conflict onset becomes exacerbated to the extent that factors co-determine the dynamics of both onset and escalation of conflict (Reed, 2000). Moreover, producing reliable estimates from escalation analyses with nonrandomly selected dispute cases is impossible (Achen, 1986, pp. 97). One of the possible solutions to circumvent the problem of selection bias is to jointly estimate the dyadic probability of onset and escalation (Reed, 2000).

Empirically, we have three alternatives for the bivariate specification. The simplest way is to estimate onset and escalation in separate models employing either logit or probit estimations, which I did employ while analyzing the determinants of the onset. This way, however, suffers from the strong assumption that onset and escalation are independent processes. If this assumption is proved to be wrong, then our estimates from two separate models would be inconsistent. Put differently, if the same covariates have an impact on both onset and escalation, then the possible indirect effect of onset on escalation has to be re-modeled (Reed, 2000).

Another alternative is to use ordered probit or logit. The advantage of this ordered model is that onset and escalation can be estimated using the same covariates; however, the directional effects of these covariates are assumed to be constant across two phases—onset and escalation. With the violation of monotonicity assumption, results would be subject to the inconsistency problem. Apart from these two alternatives, Heckman' (1974) two-stage model appears a well-suited estimation technique for cases subject to selection bias. In the two-stage model, we estimate two logits or probits. The predicted probabilities obtained from the first model—onset—are used to produce the inverse Mill's ratio, which is added into the second model—escalation. Using inverse Mills's ratio in the escalation model enables us to explain the likelihood of being selected into an escalation phase for any dyad. This approach, however, suffers from heteroskedasticity, and thus, our estimates would be inefficient. Being cognizant of these caveats, I employ the hackman probit model to analyze the onset and escalation processes in interstate relations.

Studies on interstate conflict have used variety of escalation measures: (i) the highest action of a dispute on the MID hostility scale (Maoz & Russett, 1993; Hart Jr & Reed, 1999); (ii) mutual use of force of two sides or being involved in a COW war (Bueno de Mesquita & Lalman, 1992; Schultz, 2001); (iii) occurrence of a reciprocation of the target side (Prins & Sprecher, 1999; Schultz, 2001); considerable levels of battle fatalities (Palmer et al., 2004). Considering the time period that I cover for my analyses, and hence, the availability of sufficient cases to make a reliable estimation, I rely on three escalation measures and identify three different binary variables based on these measures. I run hackman probit estimations for each escalation variable and report them separately. The first escalation variable, "Reciprocated," is generated based on whether the target state reciprocates the initiator's hostile action. The second variable, "Use of Force," identifies escalation if any side within a dyad resorts to militarized force during the dispute. The last escalation variable is "Mutual Use of Force" taking a value of one if both members of a dyad resort to force against each other during the dispute.

Explaining how the heckman selection model works and how I select independent variables for the model might help readers understand the estimation procedure. The dependent variable of the selection stage (or the first stage) is MID Onset. For each dyad–year out of more than 500000 observations, MID Onset is coded as 1 if a dispute started in a

given dyad–year, and zero otherwise. With this codification, we obtain 1061 MID onsets, all of which constitute the total sample for escalation. In other words, the dependent variable of the second stage, Escalation, is to be identified from these 1061 observations. Dyad–years without MIDs are censored, and thus, excluded from the analysis of escalation, or the second stage. The independent variables that I employed in the analyses of onset (Model 21–24) are included in the analysis of the first stage or MID Onset. The difference in the number or kind of independence variables included in the first and second stage analyses is recommended as a statistical necessity (Braithwaite & Lemke, 2011; Reed, 2000). Practically, the number of variables to be analyzed in the first stage should be more than those in the second stage. Multi-stage models, like the hackman probit, require the selection of explanatory variables with respect to their correlation with the first and second stage dependent variables. Therefore, the inclusion of independent variables is related more on model fit than on drawing inferences (Braithwaite & Lemke, 2011). Contiguity, Both Major, Allied, and Foreign Policy Similarity are excluded from the second stage analysis because they correlate more with MID Onset rather than the escalation. The results have been reported in Table 18.

Based on the results reported through Models 33–35, energy interdependence appears as negatively correlated with the MID Onset. The coefficients, however, are far from being statistically significant. In the analyses of escalation, energy interdependence between states significantly decreases the likelihood of escalation, except the model where escalation was identified as the use of force within a dyad. The coefficient in Model 34 is inexplicably positive. When we look at the control variables, contiguity remains as the strongest predictor of the MID Onset. Joint Democracies are less likely to engage in MIDs with each other. The similarity in foreign policy decision and prolonged peace between states are other factors conducive to peace. The coefficient of Both Major variables indicates that major powers are more likely to have disputes with one another. More interesting, trade interdependence has diverging impacts across two stages: while extensive trade ties promote conflict onset between states, they prevent dyads from escalating the onset occurred. As such, this finding proves the necessity of differentiating the types of interdependence in the analyses of interstate relations. Energy interdependence, in both onset and escalation processes, keeps its pacifying impact.

Table 18: Energy Interdependence and Militarized Interstate Dispute Onset and Escalation

Independent Variables$_{(t-1)}$	(Model 33) Reciprocated$_{(t)}$	(Model 34) Use of Force$_{(t)}$	(Model 35) Mutual Use of Force$_{(t)}$
Escalation			
Energy Interdependence	-18.09**	2.508	-39.20*
	(-2.25)	(1.11)	(-1.78)
Joint Democracy	0.00120	-0.00387	0.0821
	(0.01)	(-0.02)	(0.52)
Power Preponderance	-0.419	-0.148	-0.112
	(-1.22)	(-0.41)	(-0.27)
Trade Interdependence	-5.552***	-6.959***	-11.29***
	(-3.30)	(-2.94)	(-3.78)
Economic Development	0.683	-0.704	0.268
	(1.36)	(-1.43)	(0.43)
Constant	0.894***	0.714**	0.178
	(2.96)	(2.21)	(0.50)
Onset			
Energy Interdependence	-1.350	-1.342	-1.391
	(-1.35)	(-1.35)	(-1.38)
Contiguous	1.190***	1.188***	1.193***
	(18.95)	(18.78)	(18.89)
Joint Democracy	-0.202***	-0.200***	-0.202***
	(-3.16)	(-3.10)	(-3.13)
Both Major	0.462**	0.465**	0.448**
	(2.43)	(2.55)	(2.42)
Power Preponderance	0.0512	0.0473	0.0510
	(0.32)	(0.30)	(0.32)
Trade Interdependence	3.134**	3.158**	3.177**
	(2.48)	(2.50)	(2.52)
Economic Development	0.115	0.115	0.115
	(0.64)	(0.63)	(0.63)
Foreign Policy Similarity	-0.565***	-0.573***	-0.557***
	(-5.45)	(-5.61)	(-5.36)
Allied	0.108*	0.102	0.0984
	(1.70)	(1.62)	(1.54)
Peace Years	-0.133***	-0.133***	-0.133***
	(-15.17)	(-15.08)	(-15.11)
Spline 1	1.268***	1.267***	1.267***
	(10.16)	(10.07)	(10.07)
Spline 2	-4.396***	-4.377***	-4.386***
	(-8.59)	(-8.50)	(-8.49)
Spline 3	5.563***	5.521***	5.546***
	(7.08)	(7.00)	(6.99)
Constant	-1.564***	-1.554***	-1.567***
	(-10.17)	(-10.11)	(-10.23)
Selection Effect	-0.333***	-0.0470	-0.296***
	(-4.13)	(-0.58)	(-3.25)
Observations	261608	261608	261608
Estimation	heckprobit	heckprobit	heckprobit
Test	Wald	Wald	Wald
Chi-squared	26.16	12.62	23.57
Log-likelihood	-3428.6	-3415.1	-3329.0

t statistics in parentheses

* p < 0.10, ** p < 0.05, *** p < 0.01

The estimates of these unified models show that onset and escalation are related processes. Selection effect coefficients in Models 33 and 35 show the correlation between the error terms in the two stages of the model. Put differently, it indicates how onset and escalation processes are related to each other. Statistically significant coefficient enables us to reject the null hypothesis that onset and escalation are independent processes. Moreover, the negative sign suggests that the unobserved characteristics of dyads that lead them to engage in disputes are negatively correlated with those influencing the escalation process. In Model 34, the anomaly in results continues with the selection effect coefficient, which is unexpectedly positive and insignificant. Relatively low Chi-Squared statistics compared to other models makes me think about the overall validity of the model itself. To investigate the unified model of the MID Onset and escalation with respect to resource type, I re-run separate hackman probit estimations. Results have been reported in Tables 19–22.

Table 19: Coal Interdependence and Militarized Interstate Dispute Onset and Escalation

Independent Variables$_{(t-1)}$	(Model 36) Reciprocated$_{(t)}$	(Model 37) Use of Force$_{(t)}$	(Model 38) Mutual Use of Force$_{(t)}$
Escalation			
Coal Interdependence	-84.99	269.8	-39.56
	(-0.88)	(1.58)	(-0.27)
Joint Democracy	0.0863	-0.173	0.0516
	(0.57)	(-0.90)	(0.29)
Power Preponderance	-0.451	-0.224	0.117
	(-1.18)	(-0.59)	(0.27)
Trade Interdependence	-6.538***	-7.564***	-12.29***
	(-3.82)	(-3.98)	(-4.26)
Economic Development	0.424	-1.054**	-0.0356
	(0.80)	(-1.99)	(-0.06)
Constant	0.935***	0.718**	0.00703
	(2.97)	(2.20)	(0.02)
Onset			
Coal Interdependence	-90.77	-90.92	-91.18
	(-1.59)	(-1.59)	(-1.60)
Contiguous	1.159***	1.157***	1.163***
	(18.14)	(17.93)	(18.13)
Joint Democracy	-0.223***	-0.221***	-0.222***
	(-3.19)	(-3.13)	(-3.15)
Both Major	0.508**	0.505**	0.487**
	(2.45)	(2.52)	(2.39)
Power Preponderance	0.0774	0.0697	0.0751
	(0.49)	(0.44)	(0.48)
Trade Interdependence	3.516***	3.557***	3.560***
	(2.81)	(2.84)	(2.84)
Economic Development	-0.00161	-0.000589	-0.00276
	(-0.01)	(-0.00)	(-0.02)
Foreign Policy Similarity	-0.569***	-0.576***	-0.561***
	(-5.28)	(-5.44)	(-5.22)
Allied	0.127**	0.117*	0.116*
	(1.96)	(1.84)	(1.81)
Peace Years	-0.122***	-0.123***	-0.122***
	(-14.05)	(-13.98)	(-13.97)
Spline 1	1.113***	1.116***	1.115***
	(8.90)	(8.84)	(8.84)
Spline 2	-3.903***	-3.892***	-3.903***
	(-7.50)	(-7.45)	(-7.45)
Spline 3	5.009***	4.969***	5.000***
	(6.19)	(6.13)	(6.15)
Constant	-1.616***	-1.600***	-1.617***
	(-10.58)	(-10.48)	(-10.64)
Selection Effect	-0.362***	-0.0167	-0.326***
	(-4.33)	(-0.20)	(-3.48)
Observations	223270	223270	223270
Estimation	heckprobit	heckprobit	heckprobit
Test	Wald	Wald	Wald
Chi-squared	19.18	25.92	21.08
Log-likelihood	-2992.0	-2975.8	-2909.4

t statistics in parentheses

* p < 0.10, ** p < 0.05, *** p < 0.01

Table 20: Oil Interdependence and Militarized Interstate Dispute Onset and Escalation

Independent Variables$_{(t-1)}$	(Model 39) Reciprocated$_{(t)}$	(Model 40) Use of Force$_{(t)}$	(Model 41) Mutual Use of Force$_{(t)}$
Escalation			
Oil Interdependence	-14.96	3.215*	-64.97**
	(-1.11)	(1.77)	(-2.42)
Joint Democracy	-0.00765	0.108	0.217
	(-0.05)	(0.46)	(1.38)
Power Preponderance	0.0176	-0.381	0.223
	(0.04)	(-0.79)	(0.41)
Trade Interdependence	-4.514***	-6.385**	-11.71***
	(-2.61)	(-2.26)	(-3.34)
Economic Development	0.671	-0.366	-0.217
	(0.98)	(-0.52)	(-0.23)
Constant	0.490	0.931**	-0.0516
	(1.29)	(2.17)	(-0.10)
Onset			
Oil Interdependence	-0.639	-0.653	-0.733
	(-0.63)	(-0.65)	(-0.73)
Contiguous	1.034***	1.034***	1.038***
	(13.18)	(13.10)	(13.21)
Joint Democracy	-0.229***	-0.224***	-0.229***
	(-3.14)	(-3.04)	(-3.10)
Both Major	0.424**	0.421**	0.396**
	(2.26)	(2.35)	(2.14)
Power Preponderance	-0.163	-0.171	-0.165
	(-0.86)	(-0.90)	(-0.87)
Trade Interdependence	2.268	2.320	2.364
	(1.43)	(1.46)	(1.50)
Economic Development	0.0220	0.0209	0.0232
	(0.10)	(0.09)	(0.10)
Foreign Policy Similarity	-0.621***	-0.631***	-0.609***
	(-5.40)	(-5.61)	(-5.30)
Allied	0.200**	0.187**	0.182**
	(2.46)	(2.34)	(2.26)
Peace Years	-0.135***	-0.135***	-0.135***
	(-12.39)	(-12.28)	(-12.36)
Spline 1	1.328***	1.319***	1.329***
	(8.19)	(8.04)	(8.13)
Spline 2	-4.477***	-4.423***	-4.471***
	(-6.70)	(-6.53)	(-6.64)
Spline 3	5.331**	5.141**	5.334***
	(2.52)	(2.34)	(2.59)
Constant	-1.218***	-1.205***	-1.217***
	(-6.94)	(-6.84)	(-6.95)
Selection Effect	-0.347***	-0.127	-0.411***
	(-3.05)	(-1.11)	(-3.38)
Observations	98846	98846	98846
Estimation	heckprobit	heckprobit	heckprobit
Test	Wald	Wald	Wald
Chi-squared	12.77	6.338	17.51
Log-likelihood	-2155.4	-2161.2	-2051.8

t statistics in parentheses

* p < 0.10, ** p < 0.05, *** p < 0.01

Table 21: Natural Gas Interdependence and Militarized Interstate Dispute Onset and Escalation

Independent Variables$_{(t-1)}$	(Model 42) Reciprocated$_{(t)}$	(Model 43) Use of Force$_{(t)}$	(Model 44) Mutual Use of Force$_{(t)}$
Escalation			
Natural Gas Interdependence	-182.2***	118.5	-28640299.4
	(-2.65)	(1.01)	(-1.05)
Joint Democracy	-0.0171	0.0190	0.0548
	(-0.11)	(0.10)	(0.33)
Power Preponderance	-0.262	-0.302	0.107
	(-0.73)	(-0.82)	(0.26)
Trade Interdependence	-6.984***	-7.839***	-14.15***
	(-4.01)	(-4.04)	(-4.44)
Economic Development	0.678	-0.794	0.103
	(1.34)	(-1.58)	(0.17)
Constant	0.794**	0.799**	-0.00954
	(2.55)	(2.50)	(-0.03)
Onset			
Natural Gas Interdependence	-72.88***	-73.12***	-72.72***
	(-3.69)	(-3.69)	(-3.69)
Contiguous	1.169***	1.168***	1.174***
	(18.36)	(18.25)	(18.35)
Joint Democracy	-0.178***	-0.175***	-0.177***
	(-2.87)	(-2.80)	(-2.83)
Both Major	0.463**	0.465**	0.452**
	(2.43)	(2.55)	(2.46)
Power Preponderance	0.0748	0.0697	0.0738
	(0.46)	(0.43)	(0.46)
Trade Interdependence	3.346***	3.382***	3.372***
	(2.96)	(2.99)	(2.97)
Economic Development	0.0582	0.0575	0.0570
	(0.32)	(0.32)	(0.31)
Foreign Policy Similarity	-0.570***	-0.581***	-0.565***
	(-5.47)	(-5.67)	(-5.43)
Allied	0.134**	0.125**	0.123**
	(2.15)	(2.05)	(1.97)
Peace Years	-0.131***	-0.131***	-0.131***
	(-14.79)	(-14.67)	(-14.71)
Spline 1	1.263***	1.265***	1.264***
	(9.88)	(9.80)	(9.81)
Spline 2	-4.417***	-4.406***	-4.412***
	(-8.32)	(-8.27)	(-8.27)
Spline 3	5.635***	5.596***	5.619***
	(6.87)	(6.82)	(6.83)
Constant	-1.598***	-1.585***	-1.600***
	(-10.30)	(-10.23)	(-10.33)
Selection Effect	-0.356***	-0.0374	-0.301***
	(-4.27)	(-0.45)	(-3.27)
Observations	249309	249309	249309
Estimation	heckprobit	heckprobit	heckprobit
Test	Wald	Wald	Wald
Chi-squared	33.40	21.24	30.49
Log-likelihood	-3272.7	-3260.8	-3179.2

t statistics in parentheses

* p < 0.10, ** p < 0.05, *** p < 0.01

Table 22: Electricity Interdependence and Militarized Interstate Dispute Onset and Escalation

Independent Variables$_{(t-1)}$	(Model 45) Reciprocated$_{(t)}$	(Model 46) Use of Force$_{(t)}$	(Model 47) Mutual Use of Force$_{(t)}$
Escalation			
Electricity Interdependence	-18.35	-7.401	-166.7
	(-0.25)	(-0.09)	(-0.75)
Joint Democracy	0.0480	-0.00704	0.00730
	(0.29)	(-0.03)	(0.04)
Power Preponderance	-0.464	-0.161	0.111
	(-1.27)	(-0.41)	(0.26)
Trade Interdependence	-6.890***	-4.893*	-12.13***
	(-3.90)	(-1.91)	(-3.70)
Economic Development	0.510	-0.792	0.119
	(1.00)	(-1.57)	(0.18)
Constant	0.872***	0.615*	-0.0766
	(2.79)	(1.70)	(-0.21)
Onset			
Electricity Interdependence	-90.00	-89.51	-90.51
	(-1.15)	(-1.14)	(-1.15)
Contiguous	1.143***	1.141***	1.149***
	(17.19)	(17.02)	(17.08)
Joint Democracy	-0.225***	-0.223***	-0.224***
	(-3.17)	(-3.13)	(-3.13)
Both Major	0.546**	0.549**	0.532**
	(2.36)	(2.47)	(2.36)
Power Preponderance	0.104	0.0967	0.103
	(0.61)	(0.57)	(0.61)
Trade Interdependence	3.884***	3.916***	3.915***
	(2.76)	(2.78)	(2.78)
Economic Development	0.00178	0.00284	-0.000212
	(0.01)	(0.01)	(-0.00)
Foreign Policy Similarity	-0.528***	-0.537***	-0.521***
	(-5.24)	(-5.44)	(-5.20)
Allied	0.104	0.0965	0.0904
	(1.48)	(1.39)	(1.28)
Peace Years	-0.133***	-0.133***	-0.132***
	(-14.51)	(-14.45)	(-14.42)
Spline 1	1.230***	1.231***	1.225***
	(9.46)	(9.43)	(9.36)
Spline 2	-4.239***	-4.223***	-4.214***
	(-7.94)	(-7.90)	(-7.85)
Spline 3	5.349***	5.305***	5.308***
	(6.51)	(6.47)	(6.45)
Constant	-1.572***	-1.556***	-1.575***
	(-9.65)	(-9.56)	(-9.69)
Selection Effect	-0.329***	-0.00326	-0.287***
	(-3.97)	(-0.04)	(-3.04)
Observations	225747	225747	225747
Estimation	heckprobit	heckprobit	heckprobit
Test	Wald	Wald	Wald
Chi-squared	18.00	7.268	16.48
Log-likelihood	-2970.5	-2955.7	-2886.1

t statistics in parentheses

* p < 0.10, ** p < 0.05, *** p < 0.01

Without considering the statistical significance, almost all coefficients corresponding to resource-based interdependence variables indicate that interdependence is negatively correlated with both onset and escalation. Unexpected positive signs in the estimation of the second stage persist regardless of the resource types, except electricity, which is any way insignificant. The most striking finding is that although interdependence in other three primary resources fails to significantly reduce the likelihood of MID Onset, that of natural gas reduces this likelihood significantly. Even overall energy interdependence could not provide such a significant pacifying impact at the onset level. This finding reveals once more time that restricted market options and binding contracts, and hence, limited ability to diversify suppliers enhance the pacifying impact of interdependence in energy relations. Sign and significance levels of the control variables remain almost the same as in the previous estimations employing overall energy interdependence.

6.4.Energy Interdependence and Foreign Policy Similarity

Energy interdependence may shape interstate relations beyond international conflict—energy interdependence may lead to convergence in the decisions of states in foreign policies. Neoliberal-functionalist theory underpins this line of thinking. A group of states may institutionalize their trading relations through various economic agreements (e.g. customs unions, long-term preferential purchasing agreements, joint infrastructure investment projects). Such institutionalized groups reduce opportunistic behavior and optimize resource allocation within participating countries, hence increasing gains from the economic interaction among states (Abbott & Snidal, 2000). Sustaining these gains is a major motivation for states to cooperate with each other, as a result, these "preferential groupings establish a forum for bargaining and negotiation that dampens interstate tensions, promotes reciprocity, and facilitates the resolution of conflicts before they escalate" (Mansfield & Pevehouse, 2003, pp. 776).

Energy trade often requires long-term investments (e.g. long-term procurement contracts, long-term operation schemes as nuclear plant operation contracts evince, large-scale gas and oil transport projects), which may encourage states towards longer-term cooperation. This cooperative stance, in turn, may lead to a convergence in foreign policy preferences.

Alternatively, the vulnerability against potential disruption in energy flows may also shape states' decision in a way to not bother the supplier and bend to its wishes. This study discusses all these possible explanations in the light of energy politics and interdependence theory in IR. A visible international platform upon which this convergence of interests may reflect is United Nations General Assembly (UNGA) voting patterns. While a number of studies look at what makes states vote along similar lines in the UNGA (e.g. Holloway, 1990; Wang, 1999; Dreher & Sturm, 2012), the role of energy interdependence on UNGA voting similarity has not been examined yet.

6.4.1. Dependent Variable: Foreign Policy Similarity

Quantitative measures indicating the dyadic similarities in foreign policy positions of states have been available for many years and used in studies of international relations (Bueno de Mesquita, 1975; Gartzke, 1998; Signorino & Ritter, 1999). Basically, these measures aim to capture the degree to which pairs of states have "shared or opposing interests" (Hage, 2011, pp. 287). The level of similarity in foreign policy positions of states, therefore, can be used to explain states' tendencies to cooperate and fight with each other. Scholars have argued that similarity in foreign policies has an impact to improve bilateral trade (Kastner, 2007; Morrow, Siverson, & Tabares, 1998), to increase the likelihood of receiving foreign aid (Derouen & Heo, 2004; Neumayer, 2003), to enhance the effectiveness and harmony in international organizations (Stone, 2004), to curb incentives to support foreign terrorist groups (Bapat, 2007), and to reduce the likelihood of interstate conflicts (Bearce, Flanagan, & Floros, 2006; Braumoeller, 2008; Gartzke, 2007; Long & Leeds, 2006).

Foreign policy similarity measures have been calculated based on two different ways of operationalizations: (i) strength (Bueno de Mesquita, 1975) or similarity in alliance portfolios (Signorino & Ritter, 1999) or (ii) similarity in the United Nations General Assembly (UNGA) votes (Gartzke, 1998). Calculated scores based on either way is called S-score. To quantify the extent to which states are similar or dissimilar, squared or absolute distances between valued positions are calculated (Shankar & Bangdiwala, 2008, pp. 447). Empirical studies have suggested using squared distances due to "historical precedent, simplifications, and some nice properties" (Fay, 2005, pp. 175; see also Krippendorff, 1970, pp. 141). Despite some reservations regarding empirical and conceptual problems in S-score

(Bennett & Rupert, 2003; Sweeney & Keshk, 2005), the lack of reliable alternatives causes S-score to maintain its popularity in proxying foreign policy similarity of states.

Of these reservations enunciated, Hage's (2011) point deserves a particular place. He contends that S-score based on alliance portfolio similarities yields quite unlikely similarity numbers. Juxtaposing S-score of the U.K. with other permanent members of the UN Security Council during the Cold War, he demonstrates that S-scores of the U.K.-Soviet Union and U.K.–China dyads are too high compared to scores of the U.K.-France and the U.K.-U.S. dyads. In reality, however, the U.K.'s security interests during the Cold War were relatively similar to those of France and the U.S. and very different from those of China and the Soviet Union. Therefore, S-score does not reliably represent these differences (Hage, 2011). The lack of face validity in relying on alliance portfolio similarities of states while calculating S-score directs me to use the other way of operationalization in my analyses—similarity in the UNGA votes. Another advantage of this operationalization is that we could observe yearly variations in foreign policy similarity scores between states based on wide range of policy issues emerge in the U.N. Relying on alliance ties may lead to miss such variations since they require relatively more time to be established or changed, and relatively more cost to be maintained. Moreover, this cost may vary across states with respect to their certain characteristics. On the contrary, U.N.G.A. votes provide a more dynamic platform for states to explicitly reveal their policy preferences in a less and equally costly way. In the UNGA voting case,

> "[…] the act of voting is equally costly, regardless of whether the country votes "Yes," "Abstain," or "No." The only cost a country might incur in these situations is directly related to which other countries it chooses to support or oppose through its vote" (Hage, 2011, pp. 293, 294).

As Hage argues, even S-scores based on UNGA votes suffer from not reckoning "the observed distributions of individual dyad members' foreign policy ties" (Hage, 2011, pp. 294). Substantively, scores without considering the distributions miss two important aspects of the international state system: (i) foreign policy ties are relatively rare in the system and (ii) each state's proclivity to establish such ties varies. To correct S-scores by reckoning the distribution of foreign policy ties, Hage (2011) proposes to weigh S-scores with "chance-corrected agreement indices." Employing Scott's (1955) Pi and Cohen's (1960) Kappa indices, Hage weighs S-score variable and particularly suggests the usage of the former

indices to weigh similarity scores where foreign policy ties are relatively cheap (see Hage, 2011, pp. 294–298 for more detailed and technical explanations).

Using Hage's (2017) FPSIM (Foreign Policy Similarity) Dataset v2.0, I employ absolute- and squared-distance S-scores, as well as weighted ones with Pi and Kappa indices as my dependent variables, all of which are based on UNGA voting similarities to proxy foreign policy similarity within dyads. Each similarity score ranges from -1 to 1; larger numbers indicate greater similarity in international interests. Since the dependent variable is continuous, I employ the fixed-effect linear model in my estimations.

6.4.2. Independent Variable

The main independent variable of interest is basically the energy interdependence within a dyad. The analyses in this section are to investigate the extent to which energy interdependence provide convergence in foreign policy decisions within dyads. To generate a dyadic measure of energy interdependence, I have two widely utilized alternatives—Oneal and Russett's (1997) weak-link approach or Barbieri's (1996) interdependence formulation. Both approaches use dyadic dependence figures of one state to another to generate an interdependence measure.

Oneal & Russett (1997) employ the weak-link approach and identify the lower dependence score within a dyad as an interdependence measure. The weakest link approach assumes that the less dependent side defines the conflict propensity within the dyad. As Barbieri & Peters II (2003) warn, that kind of operationalization ignores the motivation or power of the more dependent state to influence the relationship. Giving credit to their warnings, I rely on the formulation proposed by Barbieri (1996) to measure dyadic interdependence. Using dyadic energy dependence figures, I respectively calculate dyadic measures of salience, symmetry, and interdependence, all of which conform to a uniform scale that ranges from 0 to 1. Dyadic salience, calculated as a geometric mean of two states' energy dependencies, gauges the extent to which partners are reciprocally dependent upon each other in the energy relationship: high salience means the relationship is important for each partner.

$$Salience_{ij,m,t} = \sqrt{ED_{ij,m,t} \times ED_{ji,m,t}}$$

where $ED_{ij,m,t}$ is energy dependence of country i to country j for energy resource m at year t and $ED_{ji,m,t}$ is energy dependence of country j to country i for energy resource m at year t. Symmetry is measured by one minus the absolute value of the difference in energy dependencies of parties constituting the dyad. According to Barbieri, the symmetry is described as the equality in dependence figures between partners: higher symmetry scores indicates balanced dependence.

$$Symmetry_{ij,m,t} = 1 - \left|ED_{ij,m,t} - ED_{ji,m,t}\right|$$

Finally, a measure of interdependence is created as the interaction of two dimensions of economic linkages—salience and symmetry. Barbieri aims to assign a high value to interdependence when both the extent and balance of dependence are high. Salience, symmetry, and interdependence have a range of values between zero and one.

$$Interdependence_{ij,m,t} = Salience_{ij} \times Symmetry_{ij}$$

This formulation calculates four different energy interdependence variables with respect to four primary energy resources—coal, oil, natural gas, and electricity. To generate overall energy interdependence variable, I simply use the overall energy dependence figures—as a total of four resource-dependencies—and re-calculate salience, symmetry, and interdependence measure respectively. I expect a positive impact of energy interdependence on dyadic foreign policy similarity.

6.4.3. Control Variables

Contiguity: Being contiguous increases not only the volume of mutual trade between countries (Arad & Hirsch, 1981), but also the likelihood of intense conflicts (Bremer, 1992; Goertz & Diehl, 1992; Vasquez & Henehan, 2001). Underlying arguments explain the relationship between a geographical proximity and conflict by referring to the contact theory—conflicts of interest are observed more likely between countries having frequent levels of contact (Waltz, 1979)—or the issue salience—geographical proximity may lead to conflicts related to severer issues more frequently between countries, such as territorial issues (Goertz & Diehl, 1992). Similar arguments might also remain valid for trade–conflict nexus: higher levels of interaction led by trade might trigger conflicts over a trading relationship or other issues. Therefore, contiguous states are expected to be less similar in their foreign

policy decisions than distant ones.

I use Stinnett et al.'s (2002) "Contiguity" definition to generate a binary variable which is equal to one if the dyad members are directly contiguous or separated by fewer than 125 miles of water. I expect a negative impact of contiguity on foreign policy similarity.

Regime Similarity: Regime types of countries appear as an important factor to control while estimating the relationship between interdependence and foreign policy similarity. A law-like theory of democratic peace has been empirically verified so many times: democracies do no fight with one another (Maoz & Abdolali, 1989; Maoz & Russett, 1993; Morgan & Campbell, 1991; Morgan & Schwebach, 1992; Ray, 1995, 1998). The similarity in norms and institutions between democratic countries might have an impact on such findings. These similarities may also keep conflict of interests between democratic states at less severe levels, or at least lead them to discuss and settle problems without causing further cleavage in foreign policy decisions (Dixon, 1993). Apart from affecting foreign policy courses of countries, especially similarity in regime types has been conceived to affect trading relationships in a positive direction (Dixon & Moon, 1993; Polachek, 1997).

I use data from Polity IV (Jaggers & Gurr, 1995) to operationalize regime types of countries, which comprises scaled information of countries' democracy and autocracy levels. I identify a regime type of a given country as a democracy if the country has a Polity score (democracy score–autocracy score) of six or greater. Then, I generate a binary variable of "Regime Similarity" if both dyad members are identified under the same regime type—democracy or autocracy.

Power Preponderance: The relationship between relative power and conflict has been discussed by many theorists and divergent positions among them have emerged; whether power preponderance or a balance of power leads to peaceful relationship remains as an empirical question (Morgenthau, 1963; Organski & Kugler, 1980). Empirical studies investigating the dyadic relationship between countries show that power preponderance, not a balance of power, is conducive to promoting peace (Bremer, 1992; Kugler & Lemke, 1996). Therefore, we can also expect that higher levels of power preponderance within dyads may provide higher similarity in foreign policy decisions, especially a convergence is expected of a relatively less powerful state towards the wishes of the more powerful state.

To operationalize power preponderance level in a given dyad, I use the COW Composite Index of National Capabilities (CINC) dataset. This dataset provides a composite index (CINC) score including salient factors contributing nationals power of a state, such as military spending, military personnel, iron, and steel production, total population, urban population, and total primary energy consumption. CINC score ranges from zero to one. Using the CINC score, I calculate power preponderance as the share of dyadic capabilities possessed by the stronger member of the dyad (Singer, 1988). The values of the variable, thus, are bounded between 0.5 and one, where 0.5 indicates that perfect equality within the dyad whereas 1 indicates that the stronger state preponderates its power.

Alliances: Alliance ties may affect both the likelihood of observing conflict within a dyad and the level of trade between states. Scholarly studies hypothesize that alliance ties make the conflict between states less likely. The fewer conflict dyads experience, the more convergence they show in their foreign policy decisions. Although such a hypothesis lacks firm theoretical and empirical agreement (Bueno de Mesquita, 1981; Bremer, 1992; Maoz & Russett, 1993), many empirical studies have included a variable corresponding to formal security alliances in their models. Besides having influenced the conflict proneness within a dyad, alliance ties may also affect the level of trade between state—states are more likely to trade with their allies (Gowa, 1994). To operationalize interstate alliance, I use Gibler and Sarkees's (2004) defense pacts data. "Allied" is a dichotomous variable equal to one if states have a defense pact with one another. Defense pacts indicate whether parties of the dyad both join in a treaty of alliance providing security guarantees of mutual assistance in the incidence either party is attacked. This type of alliance is the highest degree of common security interests which is very powerful to make parties avoid conflict and escalation.

Trade Interdependence: Motivated by optimistic arguments of classical liberal, scholars have empirically investigated the pacifying effect of trade interdependence on interstate relations. Although some scholars have demonstrated the conflict-promoting impact of this type of interdependence within dyads (Barbieri 1996), a number of studies have confirmed that trade interdependence pacifies dyads (Oneal & Russett, 1997; Polachek, 1980; Gasiorowski, 1986). The more extensive trade ties that states have, the higher expected cost of conflict that they incur. To measure trade interdependence, I rely on Correlates of War (COW) Project Trade Dataset v4.0 (Barbieri et al., 2009).

Dyadic trade interdependence needs calculation of trade dependence figures of each member of a dyad. Trade dependence of a country on its partner is calculated based on total dyadic trade—imports and exports—as a share of total trade (Oneal & Russett, 1997). To generate a dyadic measure of trade interdependence out of these dependence figures, Oneal & Russett (1997) employ the weak-link approach and identify the lower dependence score within a dyad as a trade interdependence variable. The weakest link approach assumes that the less dependent side defines the conflict propensity within the dyad. As Barbieri & Peters II (2003) warn, that kind of operationalization ignores the motivation or power of the more dependent state to influence the relationship. Therefore, I calculate the trade interdependence measure by relying on Barbieri (1996). First, I calculate the trade share of each member of a dyad as the proportion of dyadic trade flows—both import and export flows—over total trade. These trade shares are used to calculate dyadic measures of salience, symmetry, and interdependence, which conform to a uniform scale that ranges from 0 to 1. Dyadic salience, calculated as a geometric mean of two states' trade shares, gauges the extent to which trade partners are reciprocally dependent upon each other in a trade relationship: high salience means the relationship is important for each partner. Symmetry is measured by one minus the absolute value of the difference in trade shares of parties composing the dyad. According to Barbieri, the symmetry is described as the equality in energy dependence figures between partners: higher symmetry scores indicates balanced interdependence. Finally, a measure of interdependence is created as the interaction of two dimensions of economic linkages—salience and symmetry. Barbieri aims to assign a high value to interdependence when both the extent and balance of dependence are high. Salience, symmetry, and interdependence have a range of values between zero and one.

Conflict History: Dyadic conflicts or militarized disputes involved in the past may affect states' positions in foreign policy preferences and deteriorate the similarity in foreign policies. Such unfavorable incidents could also cause a disruption in energy trade. Using MID dataset v4.0, I identify whether pairs of state engage in a militarized dispute or not in a given year and generate a binary variable accordingly. A one-year lag is introduced for each explanatory variable to prevent reverse causality.

6.4.4. Results

Table 23: Energy Interdependence and Foreign Policy Similarity

Independent Variables$_{(t-1)}$	(Model 48) S Score$_{(t)}$ (UN Voting-Abs. Dist.)	(Model 49) S Score$_{(t)}$ (UN Voting-Sq. Dist.)	(Model 50) Kappa$_{(t)}$ (UN Voting-Sq. Dist.)	(Model 51) Pi$_{(t)}$ (UN Voting-Sq. Dist.)
Energy Interdependence	0.0695	-0.0296	0.554*	0.553*
	(0.81)	(-0.35)	(1.67)	(1.85)
Contiguous	0.0689*	0.0403	-0.0733	-0.0882
	(1.78)	(1.16)	(-1.15)	(-1.31)
Regime Similarity	0.0461***	0.0248***	0.0304***	0.0446***
	(20.73)	(15.08)	(10.50)	(13.07)
Power Preponderance	0.133***	0.113***	0.0564	0.0655
	(4.69)	(5.25)	(1.58)	(1.58)
Trade Interdependence	0.869***	0.638***	2.433***	2.290***
	(3.54)	(3.62)	(8.13)	(6.18)
Allied	0.0327***	0.0273***	0.0854***	0.0894***
	(3.24)	(3.77)	(5.50)	(5.20)
Militarized Dispute	-0.0211**	-0.0132**	-0.0261***	-0.0369***
	(-2.57)	(-2.28)	(-2.87)	(-2.91)
Constant	0.460***	0.623***	0.0952***	-0.00536
	(19.93)	(35.57)	(3.30)	(-0.16)
Observations	270457	270457	270457	270457
Estimation	xtreg	xtreg	xtreg	xtreg
R-Squared	0.0130	0.00915	0.00841	0.00746
F-Statistic	66.64	37.71	26.56	31.71

t statistics in parentheses

* p < 0.10, ** p < 0.05, *** p < 0.01

Table 23 shows the estimation results for overall energy interdependence variable. We do not see any statistically significant relation between energy interdependence and foreign policy similarity in Models 48 and 49, where unweighted S-scores were employed. Employing corrected S-scores, Models 50 and 51 reveal that as energy interdependence between pairs of states increases, their foreign policy decisions become more similar to each other. These findings confirm my expectation that increase in mutual vulnerability of states caused by energy interdependence leads to convergence in their policy decision. Put differently, they bend to each other's wishes as their energy relationship expands. The control variables seem to yield expected results: regime similarity makes dyads decide similarly; foreign policy similarity increases within dyads where one side preponderates its power; states having a defense pact with each other decide similarly; and extensive trade ties within dyads make them converge in their foreign policy interests. Lastly, a dispute occurred in a recent past significantly reduce the level of similarity in foreign policies.

Table 24: Coal Interdependence and Foreign Policy Similarity

Independent Variables$_{(t-1)}$	(Model 52) S Score$_{(t)}$ (UN Voting-Abs. Dist.)	(Model 53) S Score$_{(t)}$ (UN Voting-Sq. Dist.)	(Model 54) Kappa$_{(t)}$ (UN Voting-Sq. Dist.)	(Model 55) Pi$_{(t)}$ (UN Voting-Sq. Dist.)
Coal Interdependence	-0.438	-0.0540	0.633	0.794
	(-0.31)	(-0.06)	(0.30)	(0.35)
Contiguous	0.0589*	0.0315	-0.0739*	-0.0776
	(1.85)	(1.25)	(-1.65)	(-1.61)
Regime Similarity	0.0502***	0.0267***	0.0345***	0.0504***
	(20.00)	(14.63)	(10.65)	(13.10)
Power Preponderance	0.141***	0.123***	0.0529	0.0625
	(4.50)	(5.38)	(1.33)	(1.35)
Trade Interdependence	0.820***	0.509***	2.332***	2.249***
	(2.95)	(2.63)	(7.24)	(5.43)
Allied	0.0340***	0.0307***	0.0872***	0.0925***
	(3.09)	(3.87)	(5.26)	(5.02)
Militarized Dispute	-0.0177**	-0.00917	-0.0183*	-0.0304**
	(-1.98)	(-1.59)	(-1.96)	(-2.20)
Constant	0.451***	0.615***	0.0982***	-0.00684
	(17.73)	(32.89)	(3.06)	(-0.18)
Observations	229889	229889	229889	229889
Estimation	xtreg	xtreg	xtreg	xtreg
R-Squared	0.0139	0.00998	0.00889	0.00815
F-Statistic	61.13	34.65	23.80	29.54

t statistics in parentheses; * p < 0.10, ** p < 0.05, *** p < 0.01

Table 25: Oil Interdependence and Foreign Policy Similarity

Independent Variables$_{(t-1)}$	(Model 56) S Score$_{(t)}$ (UN Voting-Abs. Dist.)	(Model 57) S Score$_{(t)}$ (UN Voting-Sq. Dist.)	(Model 58) Kappa$_{(t)}$ (UN Voting-Sq. Dist.)	(Model 59) Pi$_{(t)}$ (UN Voting-Sq. Dist.)
Oil Interdependence	0.0495	-0.0488	0.904**	0.711
	(0.20)	(-0.23)	(2.03)	(1.51)
Contiguous	0.00374	0.000695	-0.119	-0.153
	(0.06)	(0.01)	(-1.10)	(-1.33)
Regime Similarity	0.0733***	0.0488***	0.0966***	0.110***
	(14.59)	(12.25)	(13.71)	(13.86)
Power Preponderance	-0.0369	0.0263	-0.0681	-0.127
	(-0.72)	(0.64)	(-0.92)	(-1.56)
Trade Interdependence	0.738***	0.468**	2.098***	1.861***
	(2.79)	(2.13)	(6.10)	(4.72)
Allied	0.115***	0.0842***	0.149***	0.176***
	(6.98)	(6.51)	(5.60)	(6.09)
Militarized Dispute	-0.0223***	-0.0139*	-0.0156*	-0.0293***
	(-2.85)	(-1.94)	(-1.66)	(-2.68)
Constant	0.531***	0.630***	0.183***	0.134**
	(12.98)	(19.09)	(3.11)	(2.04)
Observations	102212	102212	102212	102212
Estimation	xtreg	xtreg	xtreg	xtreg
R-Squared	0.0329	0.0231	0.0425	0.0366
F-Statistic	34.18	24.17	32.38	32.45

t statistics in parentheses; * p < 0.10, ** p < 0.05, *** p < 0.01

Table 26: Natural Gas Interdependence and Foreign Policy Similarity

Independent Variables$_{(t-1)}$	(Model 60) S Score$_{(t)}$ (UN Voting-Abs. Dist.)	(Model 61) S Score$_{(t)}$ (UN Voting-Sq. Dist.)	(Model 62) Kappa$_{(t)}$ (UN Voting-Sq. Dist.)	(Model 63) Pi$_{(t)}$ (UN Voting-Sq. Dist.)
Natural Gas	-0.717	-0.918	-0.591	-0.805
Interdepend.	(-1.29)	(-1.51)	(-1.34)	(-1.39)
Contiguous	0.0663*	0.0411	-0.0690	-0.0865
	(1.69)	(1.12)	(-1.05)	(-1.27)
Regime Similarity	0.0417***	0.0226***	0.0341***	0.0448***
	(18.68)	(13.58)	(11.45)	(12.78)
Power	0.117***	0.104***	0.0358	0.0603
Preponderance	(4.12)	(4.77)	(0.98)	(1.43)
Trade	1.023***	0.700***	2.525***	2.499***
Interdependence	(4.13)	(3.90)	(8.31)	(6.64)
Allied	0.0384***	0.0311***	0.0864***	0.0933***
	(3.59)	(4.01)	(5.28)	(5.12)
Militarized Dispute	-0.0175**	-0.0108*	-0.0239**	-0.0332**
	(-2.06)	(-1.80)	(-2.54)	(-2.51)
Constant	0.476***	0.633***	0.113***	0.00279
	(20.69)	(35.82)	(3.84)	(0.08)
Observations	257821	257821	257821	257821
Estimation	xtreg	xtreg	xtreg	xtreg
R-Squared	0.0111	0.00807	0.00902	0.00753
F-Statistic	54.48	31.18	28.44	30.48

t statistics in parentheses; * p < 0.10, ** p < 0.05, *** p < 0.01

Table 27: Electricity Interdependence and Foreign Policy Similarity

Independent Variables$_{(t-1)}$	(Model 64) S Score$_{(t)}$ (UN Voting-Abs. Dist.)	(Model 65) S Score$_{(t)}$ (UN Voting-Sq. Dist.)	(Model 66) Kappa$_{(t)}$ (UN Voting-Sq. Dist.)	(Model 67) Pi$_{(t)}$ (UN Voting-Sq. Dist.)
Electricity	1.345	0.663	2.344	2.401
Interdepend.	(1.51)	(1.36)	(1.60)	(1.63)
Contiguous	0.0711	0.0343	-0.0482	-0.0579
	(1.35)	(0.77)	(-0.58)	(-0.65)
Regime Similarity	0.0458***	0.0253***	0.0311***	0.0446***
	(18.59)	(14.10)	(9.45)	(11.56)
Power	0.128***	0.115***	0.0431	0.0495
Preponderance	(4.09)	(4.92)	(1.07)	(1.06)
Trade	0.991***	0.716***	2.848***	2.671***
Interdependence	(3.37)	(3.77)	(8.23)	(6.02)
Allied	0.0347***	0.0319***	0.103***	0.106***
	(3.09)	(4.00)	(6.24)	(5.77)
Militarized Dispute	-0.0172*	-0.0109*	-0.0217**	-0.0332**
	(-1.93)	(-1.89)	(-2.24)	(-2.37)
Constant	0.475***	0.631***	0.112***	0.0145
	(18.63)	(33.18)	(3.44)	(0.38)
Observations	233099	233099	233099	233099
Estimation	xtreg	xtreg	xtreg	xtreg
R-Squared	0.0122	0.00963	0.00925	0.00762
F-Statistic	53.49	33.10	24.13	26.28

t statistics in parentheses; * p < 0.10, ** p < 0.05, *** p < 0.01

Tables 24–27 report the estimation results with respect to interdependence in energy resource types. None of the models find a statistically significant relationship between energy interdependence and foreign policy similarities within dyads, except Model 58, where oil interdependence seems to be conducive to convergence in foreign policies. Natural gas interdependence, which creates the difference in previous estimations, fails to provide a significant impact on foreign policy similarities. The control variables keep the same signs and significance levels across models and the coefficients are quite similar to what we observed in Table 17, where overall energy interdependence was employed.

6.5.The Statistical Test of Russian Energy Weapon Model

My concluding analyses investigate the claims on Russian energy policy, which has been perceived by some scholars as a tool to expand Russian the influence over the foreign and security policies in the neighborhood to the smallest, and, also in Eurasia to the greatest extent (Smith, 2006; Hadfield, 2012). In fact, these intentions have been articulated many times by Russian side remarking the increasing tendency of the state to use energy as a foreign policy weapon (Buckley, 2005). These intentions also worsen security concerns of the Western countries, particularly that of the U.S., politicians of which remarks increasing dependence of European countries on Russian energy resources, and thus, vulnerability to supply disruptions would engender "less [NATO] alliance cohesion on critical foreign policy issues" in order to mollify Russia lest it should inflict energy disruptions (Kramer, 2008). Russia has also been supposed to use energy trade as a tool to split up the U.S. and Western Europe in favor of its foreign political aims (Kramer, 1985; Stern, 1990; Stein, 1983; Adamson, 1985). The following analyses will test the validity of these claims on Russian energy policy and its impact on world politics. However, along with the change in our causal mechanism, the unit of analysis for these estimations has been switched to directed-dyad–year. Since I will probe the extent to which potential energy importers from Russia converge their foreign policies with Russia, I need to employ directed-dyads in which Russia is the only exporter. Put differently, the estimations should evaluate the foreign policy behaviors of potential importers against Russia. Therefore, the direction of behaviors matters.

6.5.1. Dependent Variable: Foreign Policy Similarity with Russia

Using Hage's (2017) FPSIM (Foreign Policy Similarity) Dataset v2.0, I employ absolute- and squared-distance S-scores of all states with Russia, as well as weighted scores with Pi and Kappa indices as my dependent variables, all of which are based on UNGA voting similarities to proxy foreign policy similarity within dyads. Each similarity score ranges from -1 to 1; larger numbers indicate greater similarity in international interests. Since the dependent variable is continuous, I employ the fixed-effect linear model in my estimations.

6.5.2. Independent Variable

The main independent variable of interest is the energy dependence of a potential importer on Russia. The analyses in this section are to investigate the extent to which energy dependence provide convergence in foreign policy decisions of importers vis-à-vis Russia. The energy dependence variable is calculated as follows:

$$ED_{ij,m,t} = \frac{Exports_{ji,m,t}}{Total\ Consumption_{i,m,t}} \times \frac{Total\ Consumption_{i,m,t}}{Gross\ Energy\ Consumption_{i,t}}$$

where $ED_{ij,m,t}$ is energy dependence of country i to country j for energy resource m at yeat t. $Exports_{ji,m,t}$ denotes the exports of country i from country j for energy resource m at yeat t. While total consumption corresponds to inland consumption figures of importer country for a given energy resource, gross energy consumption gives the total inland energy consumption comprising all resources. This formulation calculates four different energy dependence variables with respect to four primary energy resources—coal, oil, natural gas, and electricity. To calculate overall energy dependence variable, I simply get the total of these four energy dependence figures. Missing values are treated as zeros if at least one of these four energy dependence figures is available. Otherwise, I left the overall energy dependence variable as missing. I expect a positive impact of energy dependence on foreign policy similarity with Russia.

6.5.3. Control Variables

Contiguity to Russia: Being contiguous increases not only the volume of mutual trade between countries (Arad & Hirsch, 1981), but also the likelihood of intense conflicts

(Bremer, 1992; Goertz & Diehl, 1992; Vasquez & Henehan, 2001). Underlying arguments explain the relationship between a geographical proximity and conflict by referring to the contact theory—conflicts of interest are observed more likely between countries having frequent levels of contact (Waltz, 1979)—or the issue salience—geographical proximity may lead to conflicts related to severer issues more frequently between countries, such as territorial issues (Goertz & Diehl, 1992). Similar arguments might also remain valid for trade–conflict nexus: higher levels of interaction led by trade might trigger conflicts over a trading relationship or other issues. Therefore, contiguous states are expected to be less similar in their foreign policy decisions than distant ones.

I use Stinnett et al.'s (2002) "Contiguity" definition to generate a binary variable which is equal to one if a potential importer is directly contiguous to Russia or separated by fewer than 125 miles of water. I expect a negative impact of contiguity on foreign policy similarity.

Regime Type of a Potential Importer: Regime types of countries appear as an important factor to control while estimating the relationship between interdependence and foreign policy similarity. Since the years of the Cold War, Russia has long been posed as a threat to Western-type democratic order. Therefore, the relations of democratic states with Russia might be expected to be different than that of non-democratic states.

I use data from Polity IV (Jaggers & Gurr, 1995) to operationalize regime type of a potential importer, which comprises scaled information of countries' democracy and autocracy levels. I identify regime type as a democracy if the country has a Polity score (democracy score–autocracy score) of six or greater.

Relative Power of Russia: The relationship between relative power and conflict has been discussed by many theorists and divergent positions among them have emerged; whether power preponderance or a balance of power leads to peaceful relationship remains as an empirical question (Morgenthau, 1963; Organski & Kugler, 1980). Empirical studies investigating the dyadic relationship between countries show that power preponderance, not a balance of power, is conducive to promoting peace (Bremer, 1992; Kugler & Lemke, 1996).

To operationalize relative power status of a given country vis-à-vis its opponent, I use the COW Composite Index of National Capabilities (CINC) dataset. This dataset

provides a composite index (CINC) score including salient factors contributing nationals power of a state, such as military spending, military personnel, iron, and steel production, total population, urban population, and total primary energy consumption. CINC score ranges from zero to one. Using the CINC score, I calculate the relative power of Russia as the ratio of the capabilities of Russia to the dyadic sum of the capabilities (Singer, 1988). Relative power measure ranges from zero to one; the smaller the values are, the stronger the potential initiator is (compared to the potential target).

Alliances with Russia: Alliance ties may affect both the likelihood of observing conflict within a dyad and the level of trade between states. Scholarly studies hypothesize that alliance ties make the conflict between states less likely. The fewer conflict dyads experience, the more convergence they show in their foreign policy decisions. Although such a hypothesis lacks firm theoretical and empirical agreement (Bueno de Mesquita, 1981; Bremer, 1992; Maoz & Russett, 1993), many empirical studies have included a variable corresponding to formal security alliances in their models. Besides having influenced the conflict proneness within a dyad, alliance ties may also affect the level of trade between state—states are more likely to trade with their allies (Gowa, 1994). To operationalize interstate alliance, I use Gibler and Sarkees's (2004) defense pacts data. "Allied" is a dichotomous variable equal to one if potential importers have a defense pact with Russia. Defense pacts indicate whether parties of the dyad both join in a treaty of alliance providing security guarantees of mutual assistance in the incidence either party is attacked. This type of alliance is the highest degree of common security interests which is very powerful to make parties avoid conflict and escalation.

Trade Dependence on Russia: Motivated by optimistic arguments of classical liberal, scholars have empirically investigated the pacifying effect of trade interdependence on interstate conflict. Although some scholars have demonstrated the conflict-promoting impact of this type of interdependence within dyads (Barbieri, 1996), a number of studies have confirmed that trade interdependence decreases the likelihood of engaging in militarized disputes (Oneal & Russett 1997; Polachek, 1980; Gasiorowski, 1986). The more extensive trade ties that pairs of states have, the higher expected cost of conflict that partners would incur. To measure trade interdependence, I rely on Correlates of War (COW) Project Trade Dataset v4.0 (Barbieri et al., 2009).

Trade dependence of a country on Russia is calculated based on total dyadic trade—imports to and exports from Russia—as a share of total trade (Oneal & Russett, 1997). Trade dependence figures conform to a uniform scale that ranges from 0 to 1.

Economic Development of an Importer: Economic development levels of states may affect both conflict likelihood between states and their trading relationship. As countries' economic development figures increases, they might refrain from involving in disputes to not sacrifice their current economic welfare. On the contrary, countries suffering from adverse economic shocks may tend to involve in interstate conflicts in order to turn attention away from domestic problems (Ostrom & Job, 1986; James, 1988; Russett, 1990).

Moreover, economic development may influence energy trading patterns between states: energy demanders may continue to import energy resources as they grow without any adverse shock. Relying on Reed's (2000) operationalization of economic development and using Gleditsch's Expanded GDP Dataset v6.0, I calculate economic development variable of a given country as an annual percentage change in real GDP per capita figures.

Conflict History: Dyadic conflicts or militarized disputes involved in the past may affect states' positions in foreign policy preferences and deteriorate the similarity in foreign policies. Such unfavorable incidents could also cause a disruption in energy trade. Using MID dataset v4.0, I identify whether potential importers engage in a militarized dispute or not with Russia in a given year and generate a binary variable accordingly. A one-year lag is introduced for each explanatory variable to prevent reverse causality. Estimation results are shown in Table 28.

6.5.4. Results

Table 28: Energy Dependence to Russia and Foreign Policy Similarity

Independent Variables$_{(t-1)}$	(Model 68) S Score$_{(t)}$ (UN Voting-Abs. Dist.)	(Model 69) S Score$_{(t)}$ (UN Voting-Sq. Dist.)	(Model 70) Kappa$_{(t)}$ (UN Voting-Sq. Dist.)	(Model 71) Pi$_{(t)}$ (UN Voting-Sq. Dist.)
Energy Dependence of Importer	-0.0818	-0.110***	-0.123	-0.100
	(-1.59)	(-2.97)	(-1.59)	(-1.17)
Importer is a Democracy	-0.0344*	-0.0127	-0.0208	-0.0346
	(-1.97)	(-1.04)	(-0.82)	(-1.26)
Allied	0.101	0.0725	0.121	0.110
	(1.54)	(1.58)	(1.06)	(0.93)
Militarized Dispute	-0.0396	-0.0348	0.000602	0.00834
	(-1.24)	(-1.38)	(0.01)	(0.19)
Relative Power of Russia	-0.495***	-0.535***	-1.451***	-1.715***
	(-2.63)	(-3.65)	(-5.62)	(-5.60)
Contiguous	0.0916	0.0702	0.0417	0.0455
	(1.51)	(1.49)	(0.48)	(0.51)
Trade Dependence of Importer	0.239	0.199*	0.333	0.345
	(1.53)	(1.82)	(1.38)	(1.32)
Econ. Growth Rate of Importer	0.0212	0.0410*	0.0979***	0.0628
	(0.66)	(1.94)	(2.69)	(1.34)
Constant	1.037***	1.213***	1.510***	1.707***
	(5.85)	(8.78)	(6.21)	(5.92)
Observations	3908	3908	3908	3908
Estimation	xtreg	xtreg	xtreg	xtreg
R-Squared	0.0372	0.0534	0.102	0.0976
F-Statistic	4.197	6.062	5.845	4.908

t statistics in parentheses

* p < 0.10, ** p < 0.05, *** p < 0.01

The energy dependence of a potential importer to Russia are negatively correlated with foreign policy similarity with Russia, which is contrary to my expectations. However, the coefficients fail to pass the threshold of statistical significance in three out of four models. The relative power of Russia emerges as the strongest predictor of foreign policy similarity with Russia. As a potential importer becomes relatively powerless against Russia, its foreign policy position towards Russia seems to be negatively affected. This might be due to the possibility that feeling insecure against Russia makes the partners more prudent against going into Russian orbit in their foreign policy decisions. Democratic importers decide dissimilarly with Russia whereas positive economic growth in importers increases similarity. Trade dependence on Russia seems to converge foreign policy decisions of importers towards that of Russia. However, we do not consistently observe statistical significance in the coefficients of the control variables across models, except those of relative power.

The estimations in Models 72–75 do not control for any information about foreign policy tendencies of potential importers. Ongoing foreign policy inclinations toward the U.S. may also be a factor influencing states' foreign policy stance against Russia. Therefore, I re-estimate the models in Table 23 by adding foreign policy similarity levels of potential importers with the U.S.. Table 29 reports the estimation coefficients.

Table 29: Energy Dependence on Russia and Foreign Policy Similarity

Independent Variables$_{(t-1)}$	(Model 72) S Score$_{(t)}$ (UN Voting-Abs. Dist.)	(Model 73) S Score$_{(t)}$ (UN Voting-Sq. Dist.)	(Model 74) Kappa$_{(t)}$ (UN Voting-Sq. Dist.)	(Model 75) Pi$_{(t)}$ (UN Voting-Sq. Dist.)
Energy Dependence of Importer	-0.128***	-0.149***	-0.139	-0.129
	(-2.91)	(-3.77)	(-1.59)	(-1.13)
Importer is a Democracy	-0.0430***	-0.0223**	-0.0183	-0.0379
	(-3.24)	(-2.26)	(-0.76)	(-1.54)
Relative Power of Russia	-0.143	-0.298**	-1.422***	-1.657***
	(-0.79)	(-2.06)	(-5.35)	(-5.29)
Trade Dependence of Importer	0.218	0.194*	0.335	0.338
	(1.55)	(1.91)	(1.37)	(1.34)
Econ. Growth Rate of Importer	-0.0237	0.00865	0.0834**	0.0309
	(-0.87)	(0.49)	(2.41)	(0.73)
Militarized Dispute	-0.0150	-0.0237	0.000800	0.0221
	(-0.43)	(-0.85)	(0.02)	(0.46)
Allied	-0.0126	0.00578	0.0503	-0.00498
	(-0.28)	(0.17)	(0.48)	(-0.05)
Contiguous	0.0194	0.0292	0.0288	-0.00983
	(0.33)	(0.63)	(0.33)	(-0.11)
Foreign Policy Similarity w/ the U.S.	-0.358***			
	(-17.91)			
Foreign Policy Similarity w/ the U.S.		-0.193***		
		(-14.32)		
Foreign Policy Similarity w/ the U.S.			-0.325***	
			(-3.87)	
Foreign Policy Similarity w/ the U.S.				-0.295***
				(-6.37)
Constant	0.643***	0.994***	1.506***	1.556***
	(3.72)	(7.25)	(5.99)	(5.15)
Observations	3874	3874	3874	3874
Estimation	xtreg	xtreg	xtreg	xtreg
R-Squared	0.182	0.161	0.121	0.144
F-Statistic	50.03	35.48	7.726	12.95

t statistics in parentheses

* p < 0.10, ** p < 0.05, *** p < 0.01

The addition of this new control variable significantly increases the R-squared and F-statistic values indicating the improvement in the model fit and validity. Foreign policy similarity levels of potential importers with the U.S. becomes the strongest predictor in these

newly estimated models: as states become much closer to the U.S.'s foreign policy position, they significantly decide dissimilarly with Russia. The inclusion of the new variable also makes energy dependence variable substantively and statistically more significant in Models 72 and 73. The sign of the coefficients remains as negative, which does not conform to my expectations. The coefficients of the control variables are quite similar to those in the previous models.

To evaluate whether natural gas dependence shapes potential importers' foreign policy stances against Russia, I re-run the models in Tables 28 and 29 by employing natural gas dependence figures of potential importers. Interestingly, our models fail to capture any significant relationship in a natural gas dependence–foreign policy similarity nexus. The results reported through Tables 30 and 31 help me partly conclude that Russian energy policy—using energy resources as a weapon to expand the influence over the foreign and security policies—proves ineffective and foreign policy concerns regarding energy weapon model of Russia are groundless.

Table 30: Natural Gas Dependence to Russia and Foreign Policy Similarity

Independent Variables$_{(t-1)}$	(Model 76) S Score$_{(t)}$ (UN Voting-Abs. Dist.)	(Model 77) S Score$_{(t)}$ (UN Voting-Sq. Dist.)	(Model 78) Kappa$_{(t)}$ (UN Voting-Sq. Dist.)	(Model 79) Pi$_{(t)}$ (UN Voting-Sq. Dist.)
Natural Gas Dependence of Importer	0.149	0.00924	-0.0474	-0.0482
	(0.84)	(0.06)	(-0.16)	(-0.15)
Importer is a Democracy	-0.0179	-0.00668	-0.0207	-0.0260
	(-0.88)	(-0.45)	(-0.69)	(-0.79)
Allied	0.122*	0.0849*	0.130	0.122
	(1.73)	(1.68)	(1.11)	(1.00)
Militarized Dispute	0.00221	0.00297	-0.00562	-0.00259
	(0.07)	(0.12)	(-0.13)	(-0.06)
Relative Power of Russia	-0.232	-0.274*	-1.334***	-1.484***
	(-1.18)	(-1.67)	(-4.53)	(-4.27)
Contiguous	0.0892	0.0647	0.0523	0.0461
	(1.55)	(1.42)	(0.58)	(0.49)
Trade Dependence of Importer	0.204	0.167	0.298	0.292
	(1.30)	(1.53)	(1.20)	(1.09)
Econ. Growth Rate of Importer	0.0341	0.0446**	0.107***	0.0885*
	(1.03)	(2.07)	(2.66)	(1.67)
Constant	0.770***	0.960***	1.403***	1.493***
	(4.25)	(6.32)	(5.10)	(4.61)
Observations	3227	3227	3227	3227
Estimation	xtreg	xtreg	xtreg	xtreg
R-Squared	0.0300	0.0322	0.0826	0.0709
F-Statistic	2.421	2.815	4.118	3.140

t statistics in parentheses; * p < 0.10, ** p < 0.05, *** p < 0.01

Table 31: Natural Gas Dependence to Russia and Foreign Policy Similarity

Independent Variables$_{(t-1)}$	(Model 80) S Score$_{(t)}$ (UN Voting-Abs. Dist.)	(Model 81) S Score$_{(t)}$ (UN Voting-Sq. Dist.)	(Model 82) Kappa$_{(t)}$ (UN Voting-Sq. Dist.)	(Model 83) Pi$_{(t)}$ (UN Voting-Sq. Dist.)
Natural Gas Dependence of Importer	-0.103	-0.154	-0.112	-0.305
	(-0.56)	(-0.94)	(-0.38)	(-0.94)
Importer is a Democracy	-0.0274*	-0.0163	-0.0182	-0.0304
	(-1.69)	(-1.28)	(-0.63)	(-1.04)
Relative Power of Russia	0.0191	-0.141	-1.300***	-1.414***
	(0.11)	(-0.97)	(-4.31)	(-4.25)
Trade Dependence of Importer	0.178	0.159	0.294	0.273
	(1.23)	(1.53)	(1.18)	(1.05)
Econ. Growth Rate of Importer	-0.00494	0.0170	0.0982**	0.0586
	(-0.17)	(0.91)	(2.51)	(1.20)
Militarized Dispute	0.00762	0.00406	-0.00378	0.00712
	(0.22)	(0.16)	(-0.08)	(0.14)
Allied	0.0240	0.0302	0.0862	0.0103
	(0.45)	(0.74)	(0.77)	(0.09)
Contiguous	0.0231	0.0312	0.0399	-0.0184
	(0.40)	(0.69)	(0.44)	(-0.19)
Foreign Policy Similarity w/ the U.S.	-0.298***			
	(-12.49)			
Foreign Policy Similarity w/ the U.S.		-0.154***		
		(-10.16)		
Foreign Policy Similarity w/ the U.S.			-0.205**	
			(-2.20)	
Foreign Policy Similarity w/ the U.S.				-0.275***
				(-5.60)
Constant	0.490***	0.842***	1.388***	1.348***
	(2.98)	(6.21)	(4.91)	(4.27)
Observations	3204	3204	3204	3204
Estimation	xtreg	xtreg	xtreg	xtreg
R-Squared	0.156	0.122	0.0921	0.118
F-Statistic	24.46	17.73	4.259	8.311

t statistics in parentheses

* p < 0.10, ** p < 0.05, *** p < 0.01

To conclude my investigations on Russian energy weapon model and reach a satisfactory answer for the scholarly claims and concerns, I estimate eight additional models. These models are to evaluate the claims that Russia uses energy trade as a tool to split up the U.S. and Western Europe in favor of its foreign political aims (Kramer 1985; Stern 1990; Stein 1983; Adamson 1985). To that end, I now employ foreign policy similarity scores of potential importers with the U.S. as my dependent variable and re-run the estimations with

the same explanatory variables included in Models 68–73. The only exception is that I now use foreign policy similarity with Russia as one of the explanatory variables. The following models are to investigate whether energy dependence upon Russia influences importers' foreign policy stances towards the U.S. In other words, these models will show the extent to which Russian energy policy is effective to split up potential importers from the foreign policy clout of the U.S.. Tables 32 and 33 show the results of models estimated.

Table 32: Energy Dependence to Russia and Foreign Policy Similarity with the U.S.

Independent Variables$_{(t-1)}$	(Model 84) S Score$_{(t)}$ (UN Voting-Abs. Dist.)	(Model 85) S Score$_{(t)}$ (UN Voting-Sq. Dist.)	(Model 86) Kappa$_{(t)}$ (UN Voting-Sq. Dist.)	(Model 87) Pi$_{(t)}$ (UN Voting-Sq. Dist.)
Energy Dependence of Importer	-0.148	-0.238*	-0.0399	-0.1000
	(-1.29)	(-1.74)	(-0.69)	(-0.62)
Importer is a Democracy	-0.0303**	-0.0425**	0.0116	-0.00534
	(-2.22)	(-2.30)	(1.51)	(-0.33)
Relative Power of Russia	0.551***	0.729***	0.430***	0.196*
	(6.07)	(6.31)	(6.55)	(1.87)
Trade Dependence of Importer	0.0678	0.0966	-0.0218	-0.00971
	(0.64)	(0.80)	(-0.29)	(-0.08)
Econ. Growth Rate of Importer	-0.104**	-0.124**	-0.0320**	-0.101**
	(-2.44)	(-2.32)	(-2.09)	(-2.40)
Militarized Dispute	-0.0263*	-0.0397**	-0.00378	0.00382
	(-1.77)	(-2.12)	(-0.21)	(0.19)
Allied	-0.245***	-0.263***	-0.206***	-0.344***
	(-4.83)	(-4.07)	(-5.02)	(-5.19)
Contiguous	-0.117**	-0.137**	-0.0426	-0.166***
	(-2.48)	(-2.60)	(-1.29)	(-3.42)
Foreign Policy Similarity w/ Russia	-0.475***			
	(-16.65)			
Foreign Policy Similarity w/ Russia		-0.602***		
		(-12.07)		
Foreign Policy Similarity w/ Russia			0.000215	
			(0.02)	
Foreign Policy Similarity w/ Russia				-0.172***
				(-6.34)
Constant	-0.472***	-0.314**	-0.364***	-0.551***
	(-5.39)	(-2.57)	(-5.84)	(-5.31)
Observations	3874	3874	3874	3874
Estimation	xtreg	xtreg	xtreg	xtreg
R-Squared	0.287	0.217	0.159	0.159
F-Statistic	45.70	36.13	9.414	21.76

t statistics in parentheses

* p < 0.10, ** p < 0.05, *** p < 0.01

Models 84–87 show a negative correlation between energy dependence on Russia and

foreign policy similarity with the U.S.. However, only the coefficient in Model 85 passes the threshold of statistical significance. No substantial change is observed in the coefficients of the control variables. Relatively powerful Russia seems to frighten potential importers and makes them approach more closely to the U.S. Being contiguous to Russia, having a defense pact with Russia, and higher foreign policy similarity with Russia decreases the affinity with the U.S.. As potential importers achieve economically higher growth rate, their affinity with the U.S. deteriorates also. Apart from these, models report two inexplicably weird results: (i) having experienced a MID with Russia does not lead potential importers to approach the U.S. but split them and (ii) being a democracy does not make importers much closer to the U.S. but reduce their affinity.

Table 33: Natural Gas Dependence to Russia and Foreign Policy Similarity with the U.S.

Independent Variables$_{(t-1)}$	(Model 88) S Score$_{(t)}$ (UN Voting-Abs. Dist.)	(Model 89) S Score$_{(t)}$ (UN Voting-Sq. Dist.)	(Model 90) Kappa$_{(t)}$ (UN Voting-Sq. Dist.)	(Model 91) Pi$_{(t)}$ (UN Voting-Sq. Dist.)
Natural Gas Dependence of Importer	-0.563**	-0.818***	-0.207*	-0.724***
	(-2.30)	(-2.62)	(-1.71)	(-2.66)
Importer is a Democracy	-0.0301*	-0.0484**	0.0145	-0.00912
	(-1.87)	(-2.23)	(1.62)	(-0.50)
Relative Power of Russia	0.731***	0.914***	0.434***	0.279**
	(5.10)	(4.86)	(5.72)	(2.19)
Trade Dependence of Importer	0.0471	0.0610	-0.0263	-0.0246
	(0.44)	(0.50)	(-0.35)	(-0.20)
Econ. Growth Rate of Importer	-0.104**	-0.129**	-0.0303*	-0.0983**
	(-2.30)	(-2.24)	(-1.87)	(-2.24)
Militarized Dispute	-0.0306*	-0.0350	-0.0280**	-0.0326**
	(-1.69)	(-1.58)	(-2.03)	(-2.01)
Allied	-0.245***	-0.267***	-0.209***	-0.356***
	(-4.95)	(-4.41)	(-5.08)	(-5.38)
Contiguous	-0.137***	-0.158***	-0.0487	-0.201***
	(-2.71)	(-2.74)	(-1.35)	(-3.82)
Foreign Policy Similarity w/ Russia	-0.499***			
	(-13.56)			
Foreign Policy Similarity w/ Russia		-0.625***		
		(-9.31)		
Foreign Policy Similarity w/ Russia			0.0130	
			(0.80)	
Foreign Policy Similarity w/ Russia				-0.179***
				(-6.03)
Constant	-0.603***	-0.441**	-0.362***	-0.585***
	(-4.51)	(-2.36)	(-5.09)	(-4.77)
Observations	3204	3204	3204	3204
Estimation	xtreg	xtreg	xtreg	xtreg
R-Squared	0.286	0.210	0.169	0.182
F-Statistic	34.59	24.56	9.487	20.40

t statistics in parentheses; * p < 0.10, ** p < 0.05, *** p < 0.01

Table 33 shows the results of re-estimated models employing natural gas dependencies rather than the overall energy dependence figures of potential importers. Since natural gas is an energy resource in which Russia has a comparative advantage in the global market, such a specification in independent variable of interest may inform us a lot. The results show that natural gas is a powerful tool for Russia to slide potential importers away from the orbit of the U.S.: increase in natural gas dependence to Russia reduces potential importers' foreign policy affinity with the U.S.. This finding proves the claims that Russia uses energy trade as a tool to split up the U.S. and Western Europe in favor of its foreign political aims.

6.6.Appraisal

This section investigated the hypotheses derived in the light of IR and energy politics literature. Empirical results show that energy dependence has a strong pacifying impact on the conflict initiation against the supplier. More interestingly, of four primary energy resources, only natural gas dependence significantly reduces the likelihood of the conflict initiation. Such a finding, in fact, is not surprising since the trade in natural gas is subject to binding contracts and confined to dyadic agreements. Moreover, diversification of natural gas needs from the spot market is quite limited, as well as expensive. Results also confirm that energy dependence significantly decreases the probability of escalation in a form of reciprocating the hostile action incurred from the initiator.

Unified models of onset and escalation reveal the pacifying role of energy interdependence in escalation processes. Although it is negatively correlated with the likelihood of conflict onset, energy interdependence coefficients fail to achieve statistical significance in these models. Natural gas continues its effectiveness in a form of interdependence: it is the only resource type, the interdependence of which significantly reduces the likelihood of conflict onset.

In the analyses of energy interdependence–foreign policy affinity nexus, I find partial support for the hypothesis that energy interdependence increases foreign policy affinity. Moreover, the test of claims regarding Russian energy policy reveals the empirical support for these claims. Although energy dependence to Russia does not lead importers to bend to Russian wishes in foreign politics, it proves effective in splitting them from the foreign policy

orbit of the U.S.. Particularly, natural gas appears as the powerful weapon to induce such a split.

CHAPTER 7

7.1.Conclusion

I began this thesis by posing a few simple questions regarding the impact of energy interdependence on interstate relations: Does energy interdependence promote peace and foreign policy similarity between states? While few in number, relevant studies all suggest that energy, as a commodity, needs to be studied separately. Energy resources are strategic and not easily substitutable, hence directly affect a state's ability to wage war (Colgan, 2013), therefore the use of military becomes a distinct option when states enter disputes with their energy trading partners (Fearon, 1995). Trade in energy resources also tends to provoke conflict since such goods are appropriable (Dorussen, 2006). In a similar vein, being highly reliant on specific types of commodities, like energy—which are hard to substitute or of which suppliers are inherently non-diversifiable, at least in the short-term—may produce vulnerability in consumer countries against suppliers, and hence asymmetrical trading relationship within dyads (Hirschman, 1945). Resultant asymmetrical ties may produce more hostile relationships within dyads (Kegley & Richardson, 1980). Alternatively, energy-dependent countries, to mitigate or eliminate their vulnerability, could resort to militarized actions against their resourceful partners (*a la* Waltz, 1979; Barbieri, 1996). On the contrary, vulnerability stemming from a high level of reliance to specific commodities, hence their suppliers, may implicitly force more dependent side to comply with the wishes of less dependent side or curb more dependent side's incentives to engage in conflict against its less dependent partner (Keohane & Nye, 1977).

Before addressing my simple question, in the light of the literature on energy politics, I contended that energy interdependence should be marked out as a different type of interdependence and the analyses of interstate relations should be made by employing dyadic energy interdependence variable. To investigate divergent scholarly claims and expectations

specifically within an energy trade framework, this thesis advances this line of research by employing a dyadic design and developing a sophisticated measure of energy interdependence that takes all primary energy resources, their corresponding import, and consumption figures, and a country's own domestic resources into account. Such a new variable was necessary to investigate arguments on energy politics and its implications for interstate relations in the more systematic way.

The Energy Interdependence Dataset, presented in a monadic, dyadic and directed-dyadic format, covered the globe for the years between 1978–2012. The dataset has been compiled from various sources which provide a double-check for interstate energy trade as well as national energy consumption and trade figures. It also standardizes information given and numbers reported in the databased utilized. The dyadic energy trade figures are broken down by four primary resource types—coal, oil, natural gas, and electricity—which in turn allowed for nuanced analysis of how interstate relations change over time.

Employing a spatiotemporally extensive energy interdependence variable, this study demonstrated that energy dependence has a strong pacifying impact on the conflict initiation against the supplier. More interestingly, of four primary energy resources, only natural gas dependence significantly reduces the likelihood of the conflict initiation. Such a finding, in fact, is not surprising since the trade in natural gas is subject to binding contracts and confined to dyadic agreements. Moreover, diversification of natural gas needs from the spot market is quite limited, as well as expensive. Results also confirm that energy dependence significantly decreases the probability of escalation in a form of reciprocating the hostile action incurred from the initiator.

Unified models of onset and escalation revealed the pacifying role of energy interdependence in escalation processes. Although it was negatively correlated with the likelihood of conflict onset, energy interdependence coefficients failed to achieve statistical significance in these models. Natural gas, however, kept its effectiveness in a form of interdependence: it was the only resource type interdependence of which significantly reduced the likelihood of conflict onset.

In the analyses of energy interdependence–foreign policy affinity nexus, I found partial support for the hypothesis that energy interdependence increases foreign policy

affinity. Moreover, the test of claims regarding Russian energy policy revealed the empirical support for these claims. Although energy dependence to Russia did not lead importers to bend to Russian wishes in foreign politics, it proved effective in splitting them from the foreign policy orbit of the U.S.. Particularly, natural gas appeared as the powerful weapon to induce such a split.

7.2.Policy Implications

Besides the scholarly outputs, the results obtained in this study may inform policy-makers across states, and especially in Turkey, on the interstate dimension of energy politics. Becoming an energy hub has been a long-set foreign policy aim of the Republic of Turkey. Setting aside the feasibility of this aim, the results have suggested that having control on valves of energy is conducive to both national security and foreign policy objectives in the world politics. On the one hand, being an energy exporter reduces the likelihood of incurring hostile actions from client countries, and thus contributes to national security without exerting so much military effort. On the other hand, being an energy supplier country provides leverage in a bargaining table and chance of influence in the international arena. Using these leverage and influence, a state would promote affinity with its client countries and reach its foreign policy goals in more costless ways.

7.3.Future Research

This study, to the best of my knowledge, is a first step towards analyzing energy interdependence–international politics nexus in a more systematic way. The dataset compiled as one of the most important contributions of this thesis would surely facilitate such analyses for scholars from both IR and energy politics branches. The dataset needs certain refinements, such as verification and triangulation of energy trade information especially between UN Comtrade and the IEA datasets, and minimization of the missing values for some dyad–years. Moreover, energy interdependence is like a double-edge sword; one the one hand, energy importer needs energy resources to maintain its military and economic activity, on the other hand, the exporter needs revenues to finance its domestic economic and military activity without putting extra burden on its public. Constructing an energy interdependence index considering both aspects of energy trade and reflecting these aspects in a single value would

be a good refinement of the energy interdependence index suggested by this study. Still, scholar may answer many research questions related to interdependence and world politics, such as the relationship between a dispute duration and energy interdependence, energy dependence and third-party intervention in conflicts, or support on rebel groups and energy interdependence. All these relationships could be analyzed more easily and systematically with the help of spatiotemporally extensive quantitative datasets.

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