CONFLICT AND THE CROSS-BORDER PIPELINE

REVISITING THE "COMMERCIAL PEACE"

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Abstract

Cross-border pipelines are pipelines that cross at least one international boundary in order to transport natural gas or crude oil from one state to another. States and multinational enterprises are planning and building new cross-border pipelines to prepare for rising long-term energy demand, to facilitate oil and natural gas production in reserves located in landlocked countries, and to integrate regional energy markets. To build and operate a cross-border pipeline, states and firms must agree upon a breadth of terms, including ownership, operation, financing, right-of-way, contracted volumes, arbitration processes, and transit fees. Therefore, cross-border pipeline projects involve significant interaction among the participating states.

This thesis seeks to determine whether the interaction that enables cross-border pipelines to exist and operate increases or decreases conflict among the participating states. This thesis uses brief case studies to demonstrate that two opposite trends from existing literature may explain the effect of cross-border pipelines on interstate conflict. First, cross-border pipelines introduce additional economic interdependence between states, which empirical studies have already shown to decrease interstate conflict. Second, cross-border pipelines exhibit high asset specificity and are thus vulnerable to the hold-up problem, which increases interstate conflict. Converting a novel and comprehensive database of cross-border oil and natural gas pipelines to a dyad-year dataset, this thesis shows through empirical analysis that cross-border pipelines have no robust effect on the incidence of interstate conflict from 1946 to 1992.

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A few hours before my final CISAC presentation, I sent an email with the subject line "very bad news" to Professor Kenneth Scheve. Minutes earlier, I had discovered that the results of my empirical analysis were no longer significant once I had removed certain outliers from my analysis. No matter – similar to how he advised me in every other crisis I found myself, he responded almost immediately with a reassuring suggestion. By writing this thesis, I gained much more than knowledge about which cross-border pipelines are where. Professor Scheve taught me how to iterate upon a data analysis, test and revise hypotheses based on empirical results, and merge theoretical concepts and empirical results into a coherent argument. Most importantly, he encouraged me to keep working on my thesis, no matter how discouraging parts of the process could become. To Professor Kenneth Scheve, thank you for being my adviser.

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Introducing the Cross-Border Pipeline

In late 2013, the Kurdish Regional Government, the government of a federal semiautonomous region of Iraq populated by Kurds, began exporting crude oil to the Turkish coast. Turkey had agreed to let the KRG connect to the existing Kirkuk-Ceyhan cross-border pipeline between Iraq and Turkey. Rather than building a connection to Kirkuk-Ceyhan within territory controlled by the Iraq central government, the KRG built a spur pipeline from the Taq Taq oilfield in Iraqi Kurdistan to the border between Iraqi Kurdistan and Turkey, thus connecting to Kirkuk-Ceyhan within Turkish territory. Moreover, Turkey agreed to make payments for the oil directly to the KRG instead of to the Iraqi central government.[1] Together, the decisions deprived Baghdad of most of its ability to interfere in the Kurdish-Turkish oil deal, as the Iraqi central government could neither withhold oil revenues from the KRG nor physically stop the flow of the pipeline – or "hold up" the pipeline – to force the KRG and Turkey to halt the deal. In other words, as long as Turkey purchased Kurdish oil, the KRG would attain a significant degree of financial independence[2] – a critical step towards achieving full independence from the Iraqi central government.

The KRG and Turkey cooperated over the Taq Taq oil pipeline despite past tensions in their relationship. Ottaway and Ottaway write:

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[1] Marina Ottaway and David Ottaway, "How the Kurds Got Their Way," *Foreign Affairs* 93, no. 3 (May 2014): 139–48.

[2] "Striking Pipeline, Kurdish Militants Deal Blow to Fellow Kurds," *Foreign Policy*, accessed May 30, 2016, https://foreignpolicy.com/2015/07/30/kurdish-militants-strike-pipeline-deal-blow-to-fellow-kurds/.

> "The Turkish government's support of the KRG's quest for financial independence was a surprising shift, since it had long opposed autonomy for Iraqi Kurdistan as a dangerous precedent given Turkey's own large Kurdish population, which has ongoing, unsettled, and often violent disputes with Ankara."[3]

The same ongoing conflict between Turkey and the Kurdish Workers' Party (PKK) has also driven a wedge between Turkey and the KRG because PKK forces maintain bases in Iraqi Kurdistan, where they seek shelter and plan future attacks on Turkish targets.[4] To eradicate the bases, Turkish military forces have frequently crossed the border and conducted operations in Iraqi Kurdistan since the 1990s, even maintaining several forward operating bases within Iraqi Kurdistan.[5] These operations increased tensions between Turkey and the primary Iraqi Kurd political groups, which refused to engage the PKK themselves and saw the Turkish military presence as a threat to the dream of Iraqi Kurdish independence. In fact, Turkish relations with the KRG reached a nadir in 2007 and 2008 after Turkey threatened to impose an economic embargo on Iraqi Kurdistan to force the KRG to deny PKK forces a safe haven,[6] and after the parliament of Iraqi Kurdistan called on the KRG to demand the closure of all Turkish bases in the autonomous region.[7]

Despite the poor political relationship, Turkey and the KRG sought improved trading relations because of the mutual economic benefits, with trade between Turkey

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[3] Ottaway and Ottaway, "How the Kurds Got Their Way."
[4] Soner Cagaptay, Christina Fidan, and Ege Sacikara, "Turkey and the KRG: An Undeclared Economic Commonwealth," *The Washington Institute*, March 16, 2015, http://www.washingtoninstitute.org/policy-analysis/view/turkey-and-the-krg-an-undeclared-economic-commonwealth.
[5] Soner Cagaptay and Ali Koknar, "Turkish Troops in Northern Iraq?," *The Washington Institute*, June 8, 2007, http://www.washingtoninstitute.org/policy-analysis/view/turkish-troops-in-northern-iraq.
[6] Patrick Cockburn, "Turkey Imposes Sanctions on Iraqi Kurdistan in Bid to Halt PKK," *The Independent*, November 2, 2007, http://www.independent.co.uk/news/world/europe/turkey-imposes-sanctions-on-iraqi-kurdistan-in-bid-to-halt-pkk-398680.html.
[7] Gareth Jenkins, "Unwelcome Guests: The Turkish Military Bases in Northern Iraq," *The Jamestown Foundation Terrorism Monitor*, March 24, 2008, http://www.jamestown.org/single/?no_cache=1&tx_ttnews%5Btt_news%5D=4807.

and Iraqi Kurdistan amounting up to 8 billion dollars in 2011. In particular, the Taq Taq oil pipeline stood out at the time due to the potential scale of its economic value. The KRG desired a reliable source of income for paying public servants, attracting more investment, and funding the Peshmerga, one of the Iraqi Kurdish groups opposing the Islamic State in northeastern Iraq. Taq Taq appealed to the KRG because the KRG could eventually earn more than 7 billion dollars per year from crude oil exports to Turkey when Taq Taq and Kirkuk-Ceyhan operated at full capacity. On the other hand, Turkey desired a reliable source of crude oil to fuel its growing economy.[8] Taq Taq appealed to Turkey because Turkey could eventually import up to 700,000 barrels of crude oil a day from Iraqi Kurdistan when Taq Taq and Kirkuk-Ceyhan operated at full capacity.[9] Moreover, while Taq Taq enabled the KRG to be financially independent from Baghdad, it rendered the KRG financially dependent on Turkey. Similarly, Turkey received the vast majority of its daily crude oil needs from Taq Taq and Kirkuk-Ceyhan, without having to import from the international market. The same Kurdish need for revenues and Turkish need for energy, combined with the success of Taq Taq and Kirkuk-Ceyhan, have led to even greater economic cooperation[10]. For instance, the KRG began building a cross-border pipeline capable of transporting up to 20 billion cubic meters of natural gas from Iraqi Kurdistan to Turkey in February 2016.[11]

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[8] "A Tortuous Triangle," *The Economist*, December 22, 2012, http://www.economist.com/news/middle-east-and-africa/21568760-governments-turkey-iraq-and-iraqi-kurdistan-play-dangerous-game.
[9] Ottaway and Ottaway, "How the Kurds Got Their Way."
[10] "Exclusive: Turkey, Iraqi Kurdistan Clinch Major Energy Pipeline Deals," *Reuters*, November 6, 2013, http://www.reuters.com/article/us-turkey-iraq-kurdistan-idUSBRE9A50HR20131106.
[11] Bruce Stanley and Khalid Al Ansary, "Cash-Strapped Iraqi Kurds to Start Gas Exports to Turkey in 2016," *Bloomberg.com*, January 13, 2016, -, http://www.bloomberg.com/news/articles/2016-01-13/cash-strapped-iraqi-kurds-to-start-gas-exports-to-turkey-in-2016.

It appears as if the interdependence generated by the Taq Taq oil pipeline not only strengthened the economic ties between Turkey and the KRG, but also improved the political relationship between the two governments. During the global oil price slump of 2015, in which KRG oil revenues plunged, Turkey sent over one billion dollars in emergency cash to Iraqi Kurdistan to enable the KRG to pay public servants and Peshmerga.[12] Repeated attempts by the PKK to sabotage Kirkuk-Ceyhan within Turkish territory not only angered Turkey, but also the KRG; after all, the KRG lost its primary source of government revenue whenever Kirkuk-Ceyhan was inoperable. For instance, in February 2016, a seven-day shutdown cost the KRG 112 million dollars.[13] The KRG eventually denounced PKK forces as a "foreign presence" that had to leave Iraqi Kurdistan.[14] More visibly, the KRG and Turkey have been economically isolating Syrian Kurdistan by shutting off border crossings[15] and digging large trenches on the borders with Syrian Kurdistan, likely because Turkey views many Syrian Kurdish military units as extensions of the PKK, and because the rivals of the KRG's dominant political party currently lead the Syrian Kurdish factions.[16] Given this newfound economic and political cooperation, Turkey has become Iraqi Kurdistan's primary regional partner, and the KRG has become Turkey's primary partner in Iraq after the Turkish government fell out with

[12] Amberin Zaman, "The Iraqi Kurds' Waning Love Affair with Turkey," *Al Monitor*, September 1, 2015, http://www.al-monitor.com/pulse/originals/2015/09/turkey-iraq-kurdistan-krg-pkk-love-affair-over.html#.
[13] "Pipeline Sabotaged by PKK Costing KRG $14m a Day in Losses: Minister," *Rudaw*, February 23, 2016, http://rudaw.net/english/kurdistan/230220165.
[14] Zaman, "The Iraqi Kurds' Waning Love Affair with Turkey."
[15] Wladimir van Wilgenburg, "Syrian Kurdish Party Calls on Turkey, KRG to End Embargo," *Al-Monitor*, November 25, 2013, http://www.al-monitor.com/pulse/originals/2013/11/syria-kurds-embargo-end-turkey-border-crossing-trade.html.
[16] Fehim Tastekin, "KRG Trench Divides Syrian, Iraqi Kurds," *Al-Monitor*, April 21, 2014, http://www.al-monitor.com/pulse/originals/2014/04/krg-trench-divides-syrian-iraqi-kurds.html.

the government of former Iraqi Prime Minister Nouri al-Maliki in 2012 over its support for Syrian President Bashar al-Assad in the Syrian Civil War.[17]

Two tentative observations can be made regarding the case of the Taq Taq and Kirkuk-Ceyhan oil pipelines between Turkey and the KRG. First, initiating long-term economic cooperation between governments with continuing political disputes and historical enmity, particularly in the form of a cross-border pipeline, is plausible. Second, successful economic cooperation between such governments, particularly in the form of a cross-border pipeline, may not only lead to greater economic cooperation, but may also lead to improved political relations. In other words, economic cooperation through cross-border pipelines may actually decrease conflict between the participating states.

Therefore, this thesis investigates whether cross-border oil and natural gas pipelines tend to mitigate or instigate conflict between the participating states – whether the experience of Turkey and the KRG can be generalized to the average experience of any states operating a cross-border pipeline.

After providing some basic information about cross-border pipelines, the rest of Chapter 1 highlights the importance of understanding the connection between such pipelines and interstate conflict, as states will have to cooperate to build many more cross-border pipelines in the near future. The first half of Chapter 2 finds that existing pipeline-specific literature focuses too much on pipelines as a source of domestic unrest and therefore makes few links between cross-border pipelines and the incidence of interstate conflict. To fill this theoretical gap, the second half of Chapter 2 uses case studies and economic thought to show how cross-border pipelines could introduce both

[17] "A Tortuous Triangle."

conflict-reducing economic interdependence and conflict-enhancing vulnerabilities among the participating states. Chapter 3 uses a novel cross-border pipeline database and a quantitative dyad-year analysis to show that the number of operating cross-border oil and natural gas pipelines within a pair of states has no net effect on the incidence of militarized interstate disputes between those states. Chapter 4 outlines two possible alternatives to explain the null effect found in the empirical analysis. Chapter 4 ends by discussing modifications to the data collected and methodology used in Chapter 3 for future analyses.

The Basics of Cross-Border Pipelines

This thesis focuses entirely on cross-border pipelines, thus excluding any pipelines that are entirely domestic and do not cross any international boundaries. A cross-border pipeline crosses at least one international boundary to transport oil or natural gas from one state to another state. To illustrate, a pipeline that transports oil from state A to state B is defined as "cross-border" because it crosses the border between the two states. For example, the Lacq-Calahorra cross-border pipeline began transporting natural gas from France to Spain in 1993. A particular type of cross-border pipeline – a transit pipeline – crosses at least two international boundaries to transport oil or natural gas from the first state to the second state through the territory of a third state. For instance, a cross-border pipeline that transports natural gas from state A to state B through the territory of state C is defined as "transit" because it crosses the border between A and C and the border between C and B. In other words, C is the "transit state" in this scenario. For example, the Baku-Tbilisi-Ceyhan transit pipeline began transporting crude oil in 2006 from Azerbaijan to Turkey, through the transit state of Georgia.

Because of the technical challenges involved in transporting natural gas, cross-border pipelines that transport crude oil feature different characteristics than those that transport natural gas. Though both crude oil and natural gas can be transported by either tanker or by pipeline, natural gas transport is significantly more complicated than crude oil transport. First, because oil pipelines carry up to four times the energy load as a natural gas pipeline, the "transport cost per unit of energy per mile" for natural gas is more than four times that of oil.[18] Put simply, it takes more time, effort, and money to transport the same energy amount of natural gas than it takes for crude oil. Second, whereas crude oil can easily be transported via tanker, natural gas must be compressed into liquid form – liquid natural gas (LNG) – for overseas transport. Even though LNG comprises 1/600th of the volume of natural gas, LNG use requires capital-intensive gasification and degasification infrastructure[19] and wastes 20% of the fuel in overseas transit.[20] Consequently, LNG transport competes with natural gas pipelines only over distances longer than 3000 miles.[21] Though improvements have been made in the LNG process, 93% of the world's natural gas is still transported by pipeline.[22]

Because most natural gas is transported via pipeline and not by tanker, gas transport and therefore gas markets tend to be local to a set of adjacent countries that participate in cross-border pipelines. Comparatively, the crude oil market is highly internationalized due to the ease at which tankers can transport crude oil, meaning that

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[18] R. Kandiyoti, *Pipelines: Flowing Oil and Crude Politics* (London ; New York : New York: I.B. Tauris ; In the United States of America and Canada distributed by Palgrave Macmillan, 2008), 16–17.
[19] Saleem Ali, "Energizing Peace: The Role of Pipelines in Regional Cooperation," Brookings Doha Center Analysis Papers (Saban Center at Brookings: Brookings Institution, July 2010), 7.
[20] Kandiyoti, *Pipelines*, 15.
[21] Paul Stevens, "Cross-Border Oil and Gas Pipelines: Problems and Prospects" (Joint UNDP/World Bank Energy Sector Management Assistance Programme, June 2003), 3.
[22] Ali, "Energizing Peace: The Role of Pipelines in Regional Cooperation," 7.

any state with a port and a less capital-intensive oil terminal can import or export crude oil via tanker. In other words, a non-landlocked state will find it relatively easy to substitute the crude oil it imports from a cross-border pipeline with crude oil from tankers; on the other hand, even a non-landlocked state will find it difficult to substitute the natural gas it imports from a cross-border pipeline if it does not already have sophisticated LNG terminals or large reservoirs of natural gas. Finally, whereas crude oil prices tend to be determined by the international spot price, natural gas prices tend to be predetermined by the states participating in the cross-border pipeline arrangement. Because of these differences, natural gas cross-border pipelines are a more significant commitment for states than oil cross-border pipelines.[23] The novel database of cross-border pipelines and quantitative analysis introduced in Chapter 3 both differentiate between oil and natural gas pipelines to account for these differences.

Both crude oil and natural gas cross-border pipelines are becoming more relevant in the twenty-first century. Because different areas of the world feature distinct geological characteristics, oil and natural gas deposits are unevenly distributed across the globe, necessitating investment into energy transmission infrastructure.[24] However, governments have only now begun to invest the $105 billion per year in infrastructure[25] necessary to meet expected demand.[26]

In particular, governments and multinational enterprises will prioritize pipelines over other forms of energy transport for the following reasons. First, as world demand for natural gas increases, most states will invest in affordable natural gas pipelines, as

[23] Kandiyoti, *Pipelines*, 14.
[24] Yuri Yegorov and Franz Wirl, "Gas Transit, Geopolitics and Emergence of Games with Application to CIS Countries," *SSRN Electronic Journal*, 2010, 3, doi:10.2139/ssrn.1560563.
[25] Ali, "Energizing Peace: The Role of Pipelines in Regional Cooperation," 7.
[26] Kandiyoti, *Pipelines*, 1.

opposed to the expensive infrastructure necessary to import LNG from overseas. Second, as states move to diversify their oil imports, the redevelopment of oil production in landlocked or relatively landlocked states will necessitate overland transport via pipeline. Third, rising demand for oil and natural gas in East Asia, which has saturated regional capacity, will partially be met with new "east-west" pipelines connecting the natural resources of Russia and the Central Asian republics to markets in China. Fourth, in order to reduce its dependency on Russian natural gas and Middle Eastern oil, the European Union will invest in both overland and submarine pipeline infrastructure throughout the Mediterranean. Fifth, should Iran comply with the recent Joint Comprehensive Plan of Action by curtailing its nuclear programs and international sanctions on Iran be lifted, MNEs will help Iran develop its vast oil and natural gas resources along with pipelines to transport those resources to Turkey, China, and India. Because states will construct many more cross-border pipelines in the near future, gauging their effect on interstate conflict may indicate some best practices for managing such pipelines.

The Relevance of Cross-Border Pipelines

Due to institutional reforms, increasing cost-competitiveness, and concerns over the role coal plays in climate change, world demand for natural gas is increasing. In the 1990s, many states, particularly those in the Organization for Economic Co-operation and Development, removed restrictions that characterized natural gas as a "premium" resource too precious for civilian consumption.[27] At the same time, combined cycle gas turbine (CCGT) plants that burned natural gas to generate electricity became cost-

[27] Stevens, "Cross-Border Oil and Gas Pipelines: Problems and Prospects," 4–8.

competitive with burning coal.[28] Finally, developed and developing countries increasingly favor the use of natural gas – the "least dirty hydrocarbon" – as a source of energy due to concerns over climate change. Since the transport of natural gas is accomplished almost entirely by pipeline, future growth in production will necessitate new pipelines.

Besides increasing demand for natural gas, accessing newly redeveloped oil production in the landlocked republics of Central Asia and relatively landlocked Iraq will require the construction of overland pipelines to move oil to European and Asian markets. Depletion of reserves more accessible by world markets and the fall of the USSR in 1991 have led MNEs and governments, particularly the United States, to look towards redeveloping the oil reserves of the landlocked Central Asian republics of Azerbaijan, Kazakhstan, and Turkmenistan.[29] With proven crude oil reserves between 17 billion and 22 billion barrels,[30] experts agree that the Caspian reserves will be a critical source of crude oil to meet rising world demand.[31] Some questions remain about the extent to which undiscovered reserves in the area exist.[32] Azerbaijan, Kazakhstan, and Turkmenistan view the development of their oil and gas as integral to economic growth, yet their geographic location means that they will have to construct pipelines through

[28] Kandiyoti, *Pipelines*, 14.
[29] Paul Stevens and Royal Institute of International Affairs, *Transit Troubles: Pipelines as a Source of Conflict* ([London, England]: Chatham House, 2009), 3.
[30] Bülent Gökay, ed., *The Politics of Oil: A Survey / Edited by Bülent Gökay*, 1st ed, Politics of ... Series (London ; New York: Routledge, 2006), 49.
[31] Hooman Peimani, *The Caspian Pipeline Dilemma: Political Games and Economic Losses* (Westport, Conn: Praeger, 2001), 1.
[32] Paul Horsnell, "Caspian Oil and Gas: A Game, If Not a Great Game" (The Oxford Institute for Energy Studies, January 1, 1999), http://www.oxfordenergy.org/1999/01/caspian-oil-and-gas-a-game-if-not-a-great-game/.

their neighbors' territories.[33] Despite the wishes of those states, as Peimani writes, "in the absence of suitable long-term export routes, extensive-energy development projects cannot and will not be implemented," as only long-term exports, not domestic sales, will make investment in resource production profitable in the long-term.[34] Some investors view new cross-border pipelines in Central Asia as necessary because they deem exporting Central Asian resources using the existing Soviet-era pipeline networks that run through Russia and Georgia as overly-politically risky.

Similarly, the re-opening of Iraq to foreign governments and MNEs interest could make Iraq the largest crude producer and exporter in the world should production increase as projected and Iraq construct new pipeline export routes. With only 21 partially developed oilfields out of 80 discovered oilfields, and 30% of Iraq still to be surveyed for oil, Iraq may have 200 billion barrels of oil more than documented.[35] Historic financial and legal mismanagement of Iraqi production, a lack of access to new technology under Saddam due to UN sanctions, and three wars have obstructed Iraqi oil production since 1979.[36] At the same time, oil production in Iraq is the most cost-competitive in the world – at least three times cheaper than the current largest exporter, Saudi Arabia.[37] Moreover, re-development contracts made in 2011 between Iraq and MNEs, if successful, could make Iraq the largest crude oil producer and exporter in the

[33] Gökay, *The Politics of Oil*, 42.
[34] Peimani, *The Caspian Pipeline Dilemma*, 113.
[35] Mamdouh G. Salameh, "Iraq: An Oil Giant Constrained by Infrastructure & Geopolitics," *SSRN Electronic Journal*, 2013, 1–2, doi:10.2139/ssrn.2371770.
[36] Ibid., 5.
[37] Ibid., 9.

world by 2020.[38] However, Iraq would have to develop more export capacity by investing in both cross-border pipelines and oil terminals on the Persian Gulf.[39]

On the demand side, as rising need for energy resources surpasses the regional supply of natural gas and crude oil, East Asia will import more resources from the Middle East and Russia, primarily through "east-west" pipelines that diversify current modes of import.[40] For instance, demand for crude oil in East Asia will increase by 10 million barrels per day in the next decade.[41] To satisfy rising demand, China and Kazakhstan established a 1400-mile long crude oil pipeline from the Caspian Sea to Xinjiang, and over the past decade, China, Turkmenistan, Uzbekistan, and Kazakhstan collaborated to construct a natural gas pipeline beginning in Turkmenistan and terminating in Xinjiang. After all, China views relying on LNG imported from the sea an unacceptable risk due to China's perceived vulnerability to a naval blockade and its perceived dependence on the Middle East.[42] Therefore, China will continue pursuing the construction of more "east-west" pipelines.

Similarly, the European Union, unnerved by recent gas disputes between Russia and transit state Ukraine and now wary of climate change and energy dependence, aims to diversify its imports around the world through new pipelines. The EU is a net importer of natural gas and achieved 70% energy dependence on imports in 2010, and the gap between current supply and its rising demand only increases.[43] To meet rising demand in the future, the EU must invest $150 billion to $200 billion in natural gas infrastructure,

[38] Ibid., 3.
[39] Ibid., 7.
[40] Stevens and Royal Institute of International Affairs, *Transit Troubles*, 4.
[41] Peimani, *The Caspian Pipeline Dilemma*, 2.
[42] Stevens, "Cross-Border Oil and Gas Pipelines: Problems and Prospects," 2.
[43] Kandiyoti, *Pipelines*, 21.

primarily pipelines.[44] Moreover, the EU is considering alternative pipelines throughout the Mediterranean to reduce its dependence on the Middle East, from which 45% of all EU oil imports originate, and on Russia, from which 40% of all EU gas imports originate.[45] In particular, 84% of Russian gas supplies to EU transit via pipeline through Ukraine,[46] and following increasing Russian belligerence in Eastern Europe and the Ukraine-Russian gas disputes of 2006 and 2009, during which gas supply to Europe was disrupted, the EU no longer believes its energy supply is secure.[47] Despite the goals of the EU, Russia continues to maneuver Gazprom into a position in which the EU and Turkey continue to rely on Russian gas.[48] At the same time, increasing demand for natural gas in East Asia siphons off an increasing amount of LNG from the Middle East and Malaysia and natural gas from Russia through "east-west" pipelines, threatening Europe's natural gas supply.[49] Finally, projections indicate that natural gas could play an integral part in EU's emissions-reduction plans, as the EU could meet half of its carbon dioxide emissions-reduction goals if it converted all of its thermal power plants to CCGT.[50] All of these factors converge upon a need to attain more imports from Africa and the Caspian region, potentially achieved through a new Trans-Adriatic pipeline, a

[44] Patrick Cayrade, "Investments in Gas Pipelines and Liquefied Natural Gas Infrastructure. What Is the Impact on the Security of Supply?," *SSRN Electronic Journal*, 2004, 1, doi:10.2139/ssrn.593721.
[45] Kandiyoti, *Pipelines*, 22.
[46] Rafael Leal-Arcas and Mariya Peykova, "Energy Transit Activities: Collection of Intergovernmental Agreements on Oil and Gas Transit Pipelines and Commentary," Legal Studies Research Papers (Queen Mary University of London, School of Law, December 2014), 7.
[47] Rafael Leal-Arcas and Juan Rios, "How Can the EU Diversify Its Energy Supply to Improve Its Energy Security?," Legal Studies Research Papers (Queen Mary University of London, School of Law, 2015).
[48] Stevens and Royal Institute of International Affairs, *Transit Troubles*, 5.
[49] Franziska Holz, Philipp M. Richter, and Ruud Egging, "The Role of Natural Gas in a Low-Carbon Europe: Infrastructure and Regional Supply Security in the Global Gas Model," *SSRN Electronic Journal*, 2013, doi:10.2139/ssrn.2239652.
[50] Cayrade, "Investments in Gas Pipelines and Liquefied Natural Gas Infrastructure. What Is the Impact on the Security of Supply?," 2.

Trans-Anatolian pipeline, the Nabucco pipeline, a South Stream pipeline, and a Trans-Saharan pipeline.[51]

Finally, possible sanctions relief for Iran following Iranian compliance with the 2015 Iranian nuclear deal, the Joint Comprehensive Plan of Action, will open Iran's vast oil and natural gas reserves to joint Iranian and MNE development, which will require additional pipelines for export. In addition to oil reserves, Iran lays claim to most of the gas formations of the Persian Gulf, which hold 41.3% of the world's gas reserves and currently measure at 10.2% of world gas production.[52] However, similar to Iraq, international isolation and muted technological progress have prevented Iran from properly developing its oil and gas resources. Historically, poor relations between Iran and the United States, particularly over Iran's nuclear program, meant significant barriers to MNE and friendly government participation in Iranian oil and natural gas development projects.[53] For instance, the US forced American and European MNEs to cancel plans to create a pipeline through the most cost-efficient and reliable oil export route from the Caspian region, which went through Iran, and construct the significantly more costly and less reliable Baku-Tbilisi-Ceyhan pipeline that terminates in Turkey, a NATO ally of the US. Similarly, the US placed enough pressure on European MNEs interested in developing Iranian oil and natural gas reserves, particularly in the South Pars gas field, to discontinue their plans.[54] Finally, over the past few decades, the US, helped by tensions between Pakistan and India, has dissuaded the two states from constructing the Iran-Pakistan-India natural gas pipeline with Iran and instead has suggested a possible

[51] Leal-Arcas and Rios, "How Can the EU Diversify Its Energy Supply to Improve Its Energy Security?," 1–2.
[52] Stevens and Royal Institute of International Affairs, *Transit Troubles*, 4.
[53] Ibid., 6.
[54] Peimani, *The Caspian Pipeline Dilemma*, 3–4.

Turkmenistan-Afghanistan-Pakistan-India natural gas pipeline, despite a clear lack of feasibility due to instability in Afghanistan. However, possible sanctions relief has already recreated interest in pipelines running through Iran, such as the Nabucco pipeline to transport Iranian gas through Turkey and Southeastern Europe to Germany,[55] or an economically sensible oil pipeline running from Azerbaijan through Iran for export,[56] for which Azerbaijan has already expressed interest.[57]

The five factors mentioned above explain why states will build more cross-border oil and natural gas pipelines in the future. The following section contrasts global need for more cross-border pipelines with the legal difficulties faced by states and firms involved in such projects – legal difficulties that might result in interstate conflict.

The "Multilateral Challenge" of Cross-Border Pipelines

The growing need for cross-border pipelines has led to heightened scrutiny of the inadequacy of existing legal regimes that govern cross-border pipelines. Barton writes that the twentieth century saw the normalization of managing territorial disputes, ideological competition, ethnic irredentism, and nuclear proliferation, yet did not see the development of a global system for governing energy resources, development, transport, and markets.[58] Energy experts widely acknowledge that interstate energy cooperation, particularly the rules of transit, has not made as much institutional progress as have the norms that protect trade, bilateral investments or foreign direct investment, and the

[55] Stevens and Royal Institute of International Affairs, *Transit Troubles*, 6.
[56] Peimani, *The Caspian Pipeline Dilemma*, 4.
[57] Giorgi Lomsadze, "Post-Iran Deal, Azerbaijan Eyes Energy Transit Opportunities," *EurasiaNet*, July 15, 2015, http://www.eurasianet.org/node/74236.
[58] Barry Barton, ed., *Energy Security: Managing Risk in a Dynamic Legal and Regulatory Environment* (Oxford ; New York: Oxford University Press, 2004), 2.

environment.[59] As a result, the construction and operation of cross-border pipelines place additional burdens on the participating states and firms to enumerate and agree upon the characteristics of the legal regimes governing the pipelines – the so-called "terms of transit" – which include right-of-way, volume of supply, emergency measures, pricing, tariffs, duties, fees, taxes, ownership, operation, extension, access to excess capacity, quality control, etc. Without normalization, legal or financial disputes over the terms of transit of cross-border pipelines could potentially lead to interstate conflict.

Existing international law only normalizes submarine pipeline transit. The 1982 United Nations Convention on the Law of the Sea guarantees the "unequivocal right" of all states to deploy submarine pipelines while respecting existing submarine pipelines.[60] States can also lay pipelines on the continental shelf of other states, provided that they receive consent from the coastal state about the physical course of the pipeline on the shelf; in return, coastal states have an obligation not to prevent states from deploying or maintaining submarine pipelines. Therefore, this norm ensures the right-of-way for cross-border submarine pipelines, even if it does not address issues of jurisdiction, ownership, and operation. However, the vast majority of cross-border pipelines are on-land and thus are not governed by a specific set of norms under international law.[61]

Without particular international norms for most cross-border pipelines, participating states fill in the details of the terms of transit through negotiations, which may create latent problems or inefficiencies that may threaten the legal regime in the

[59] Leal-Arcas and Peykova, "Energy Transit Activities: Collection of Intergovernmental Agreements on Oil and Gas Transit Pipelines and Commentary," 7.
[60] Sergei Vinogradov, "Cross-Border Pipelines in International Law," *Natural Resources & Environment* 14, no. 2 (1999): 76.
[61] Ibid., 78.

future. Vinogradov introduces the two models of cross-border pipeline arrangements that the participating states can adopt:

> "The traditional approach deals with a cross-border pipeline as a system of connected national pipelines, with each 'national' section of the cross-border infrastructure being under the territorial jurisdiction of a respective state and governed by its domestic law. There is an emerging trend, however, to regard a cross-border pipeline as a unit to be dealt with in a comprehensive manner."[62]

In the traditional "patchwork" approach, each national section is subject to the particular regulatory and pricing regime of the state in which it operates, while at the same time, the parties representing each unique national section attempt to agree upon the overall terms of transit. This historical model exposes pipeline constructors, operators, and owners to multiple legal regimes and disputes over the differences, which is why beginning in the 1990s, investors began supporting the model of a cross-border pipeline as a single legal regime with all of the terms of transit agreed upon ahead.[63] Rather than having a network of owners and operators, consortium firms comprised by firms from each participating state as well as other MNEs own and operate the entire pipeline. While the second model may improve the flow of energy, it does not guarantee that each participating state will be content with the terms of transit throughout the entire lifetime of the pipeline.

Arbitration of disputes over the terms of transit of cross-border pipelines tends to be ineffective, which may instigate interstate disputes and even conflict. Stevens writes that no international institution possesses overarching legal jurisdiction in the event of a dispute over the terms of a cross-border pipeline[64]. Even if such an institution existed, it may not be effective. In general, investors and firms face uphill legal battles in

[62] Ibid., 75.
[63] Leal-Arcas and Peykova, "Energy Transit Activities: Collection of Intergovernmental Agreements on Oil and Gas Transit Pipelines and Commentary," 8.
[64] Stevens, "Cross-Border Oil and Gas Pipelines: Problems and Prospects," 20.

international arbitration courts when they attempt to hold states liable for broken contracts or broken contracts that fell under the auspices of a bilateral investment treaty with an umbrella clause that compelled those states to comply with all obligations to investors.[65] Since many cross-border pipelines are owned or operated by state-owned firms, legal disputes could pit one state against another. The international community made some progress in normalizing energy transit by passing the Energy Charter Treaty in 1998, which provides best practices for pipeline regimes such as model intergovernmental agreements, provides mechanisms for dispute resolution, and prohibits tampering with pipelines and discriminating against firms and states.

However, the ECT regime still lacks the authority and legitimacy to enforce rulings. For example, recent disputes between Russia and MNE Yukos led to international arbitration under the ECT, in which The Hague awarded 50 billion dollars in damages to Yukos. However, Russia responded to the ruling by refusing to pay the damages and withdrawing from ECT.[66] Clearly, the freedom of transit, which ECT enshrines as key to "collective energy security... since energy resources are increasingly being transported across multiple national boundaries on their way from producer to consumer" has not been normalized.[67] In addition, OPEC members refuse to join the ECT, as they would prefer not to be bound by its charter. Therefore, while it has made some progress, the ECT is still inadequate.

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[65] Delphine Nougayrède, "Binding States: A Commentary on State Contracts and Investment Treaties," SSRN Scholarly Paper (Rochester, NY: Social Science Research Network, September 1, 2005), http://papers.ssrn.com/abstract=2374741.

[66] Keith Johnson, "What's Really Happening With the Yukos Case," Foreign Policy (Council on Foreign Relations, June 19, 2015), https://foreignpolicy.com/2015/06/19/whats-really-happening-with-the-yukos-case-russia-putin-belgium-france/.

[67] Leal-Arcas and Peykova, "Energy Transit Activities: Collection of Intergovernmental Agreements on Oil and Gas Transit Pipelines and Commentary," 9.

The growing need for additional cross-border oil and natural gas pipelines indicates that the subject of this thesis – whether cross-border oil and natural gas pipelines tend to mitigate or instigate conflict among the participating states – is relevant to ongoing policy planning. Despite the growing number of cross-border pipelines, international norms and arbitration processes governing energy transit remain ineffective, rendering the legal governance of cross-border pipelines a "multilateral challenge." Without effective and respected legal regimes, violations of or attempts to renegotiate the terms of transit could worsen relations and increase conflict between states. At the same time, the anecdotal example of the Taq Taq and Kirkuk-Ceyhan oil pipelines between Turkey and the KRG indicates some potential for cross-border pipelines to reduce conflict and improve relations. Chapter 2 delves into pipeline-specific and political economy literature to isolate two clear mechanisms by which a cross-border pipeline could reduce or increase interstate conflict – beneficial economic interdependence and the "hold up," respectively.

Chapter 2

Peace, Pipe, and Dreams: A Theoretical Anatomy of the Cross-Border Pipeline

Any empirical analysis of a factor that could affect the incidence of interstate conflict must begin with a theoretical review of the causal mechanisms generating the effect. Unfortunately, the vast majority of the existing pipeline literature does not make any claims about how pipelines affect interstate conflict, but rather focuses on one of two topics. Technically-oriented authors address the logistical considerations underpinning the planning, construction, and operation of pipelines by collecting empirical data and developing mathematical models for construction, maintenance, and operational costs.[1,2] On the other hand, legally-minded authors investigate how cross-border pipelines pose the so-called "multilateral challenge" discussed in Chapter 1. Both topics understandably reflect a highly practical bend within pipeline literature oriented towards ensuring the operational success of a pipeline over its lifespan.

While the remaining minority of pipeline literature draws some direct and indirect links between pipelines and conflict, their claims tend not to address the exact processes by which cross-border pipelines affect interstate conflict. Historical studies of pipelines focus on how pipelines instigate domestic conflict in developing countries by displacing indigenous populations, fueling anti-government and anti-foreign resentment, and being the target of theft and sabotage. Studies of how pipelines affect regional relationships

[1] Jean Masseron, Nissim Marshall, and Gillian Harvey-Bletsas, eds., *Petroleum Economics*, 4th ed., updated and expanded, Institut Français Du Pétrole Publications (Paris: Editions Technip, 1990), 222–232.

[2] N. A. Krylov, ed., *The Oil Industry of the Former Soviet Union: Reserves and Prospects, Extraction, Transportation* (Amsterdam: Gordon & Breach, 1998), 185–271.

highlight how regional and extra-regional actors try to influence the direction of planned pipelines or how pipelines could fit within regional security and economic frameworks without empirically examining the past effects of existing cross-border pipelines. Therefore, while most of the existing pipeline literature is inadequate, a review of the economic fundamentals of pipelines suggests two broad opposing mechanisms by which pipelines could decrease or increase interstate conflict: the introduction of economic interdependence between participating states, and the exposure of each state to the "hold up" problem. This chapter briefly reviews existing pipeline literature, connects the economic fundamentals of pipelines to past scholarly work on economic interdependence and the "hold up" problem, and uses two short case studies to illustrate those mechanisms operating in historical cross-border pipelines.

Conflict and Cooperation in Pipeline Literature

Historical case studies and analyses typically view pipelines as irrevocably tied to domestic conflict, rather than interstate conflict. The "resource militarization" hypothesis posits that state interest in securing the land corridor through which a pipeline runs pits the state against its civilians, whether in the form of forcing farmers off their lands with paramilitaries hired by multinational enterprises (MNEs) and the government or collateral damage caused by counterinsurgency.[3] Local populations often view the natural resource as part of their national treasure and decry unequal distribution of oil and natural gas profits between MNEs and the state and also among different geographical and ethnic groups within the state. Often the "softest" and least protected links in oil and natural gas production and transmission infrastructure, pipelines are easy targets for insurgents

[3] Kandiyoti, *Pipelines*, 43–48.

operating in host or transit countries.[4] The National Memorial Institute for the Prevention of Terrorism recorded more than 330 attacks against oil and natural gas infrastructure around the world between 1990 and 2005,[5] with recent occurrences of pipeline sabotage in Turkey,[6] Nigeria,[7,8,9] and even the United States.[10] Kandiyoti asserts that activists and insurgents damage pipelines to signal their displeasure with government policies and to decrease oil and natural gas revenues to the government so it can exert less control over their interests.[11]

Typically, increased insurgency and pipeline sabotage in one state is typically orthogonal to conflict among the other states participating in a cross-border pipeline. However, since states might foster insurgency in their regional adversaries, cooperation through a cross-border pipeline may create an incentive for states to stop supporting insurgents that target their pipelines, albeit in their rival's territory. For instance, some claim that alleged Iranian and Indian support for separatists in Baluchistan, a region in Pakistan through which the fabled Iran-Pakistan-India cross-border pipeline would operate if constructed, would have to end so as to not endanger the cross-border

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[4] Gal Luft and Anne Korin, "Terror's next Target," *Institute for the Analysis of Global Security*, March 28, 2005, http://www.iags.org/n0111041.htm.
[5] Daniel Moran and James A. Russell, eds., *Energy Security and Global Politics: The Militarization of Resource Management*, Routledge Global Security Studies 6 (London ; New York: Routledge, 2009), 71.
[6] David O'Byrne, Tamsin Carlisle, and Stuart Elliott, "Bomb Attack on Iraq-Turkey Pipeline Halts Crude Oil Supplies - Oil | Platts News Article & Story," *S&P Global Platts*, July 29, 2015, http://www.platts.com/latest-news/oil/istanbul/bomb-attack-on-iraq-turkey-pipeline-halts-crude-26162030.
[7] Philips O. Okolo and Ambily Etekpe, "Oil Pipeline Vandalization and the Socio-Economic Effects in Nigeria's Niger Delta Region," *SSRN Electronic Journal*, 2010, doi:10.2139/ssrn.1723169.
[8] "Suspected Vandals Sabotage Shell's Crude Pipeline One Week after Repair," *Premium Times Nigeria*, July 13, 2013, http://www.premiumtimesng.com/news/140861-suspected-vandals-sabotage-shells-crude-pipeline-one-week-after-repair.html.
[9] Elisha Bala-Gbogbo, "Nigeria Power Plans Must Overcome Gas-Pipeline Sabotage," *Bloomberg.com*, June 10, 2015, http://www.bloomberg.com/news/articles/2015-06-10/nigeria-power-plans-must-overcome-gas-pipeline-sabotage.
[10] Lauren Krugel, "Enbridge Pipeline Sabotage Prompts Security Boost," *The Huffington Post*, January 17, 2016, http://www.huffingtonpost.ca/2016/01/17/enbridge-pipeline-sabotage_n_9002984.html.
[11] Kandiyoti, *Pipelines*, 31.

pipeline.[12] While plausible, this theory applies to so few of the world's current and future cross-border pipelines because investors are dissuaded from backing pipelines that run through politically-risky countries or areas with insurgencies,[13] which is one of the very reasons why neither the Iran-Pakistan-India pipeline, nor its direct competitor the Turkmenistan-Afghanistan-Pakistan-India pipeline, have been built.

Instead of using a domestic focus, several authors have investigated the relationship between pipelines and global political conflict. One school of thought argues that great powers compete in a grand geopolitical game over energy resources and pipelines, since they are an increasingly important mode of energy transport. Because states often view energy security as a zero-sum game,[14] Barton notes that conflict over access to energy resources "is almost incontestably the single most alarming prospect facing the international system today."[15]

As a result, great powers, which seek to secure their own energy resources, compete over the direction of pipelines. For example, the US sought to deprive the USSR of hard currency earned from resource sales by purportedly sabotaging Siberian pipelines[16] and of strategic leverage over US allies (or "protectorates") in Europe by prohibiting sales of pipe.[17] Since US political influence in the Persian Gulf remains

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[12] Ibid., 13.
[13] Mark H. Hayes and David G. Victor, "Factors That Explain Investment in Cross-Border Natural Gas Transport Infrastructures: A Research Protocol for Historical Case Studies" (Center for Environmental Science and Policy: Stanford University, 2004), 1.
[14] Leal-Arcas and Peykova, "Energy Transit Activities: Collection of Intergovernmental Agreements on Oil and Gas Transit Pipelines and Commentary," 19.
[15] Barton, *Energy Security*, 2.
[16] Kandiyoti, *Pipelines*, 31.
[17] Jonathan Stern, "Gas Pipeline Co-Operation between Political Adversaries: Examples from Europe," Submission to Korea Foundation (Chatham House, January 2005).

strong after the US prevented Soviet interference during the Cold War,[18] the contest over oil-rich territories and overland energy transmission has moved to the post-Soviet states of Central Asia.[19]

Authors refer to the conflicts over proposed pipelines in Central Asia as clear evidence of a grand geopolitical game over energy resources played primarily by the US and Russia. After the fall of the USSR, Russia exerted significant control over the Central Asian republics it viewed to be in its sphere of influence by controlling their access to the legacy Soviet pipeline network that carried their oil and natural gas to markets.[20] To ensure that its allies, particularly those in Europe, relied upon sources of energy over which the US exerts political influence, such as the Middle East, the US became interested in Central Asia due to its proximity to other great powers and its proven oil and natural gas reserves.[21] Barton contends that the US fears Russia, which is "most inclined to view its market position as a direct source of strategic leverage" due to its possession of significant energy reserves and pipeline infrastructure for exporting production.[22] Therefore, US interest in Central Asia is particularly political, as its own oil needs have been met by Persian Gulf exports,[23] domestic production, and imports from Canada. For instance, the US government lobbied heavily for MNE involvement in building a longer, more expensive, less safe, and less reliable Baku-Tbilisi-Ceyhan pipeline from the Caspian region through Georgia and Turkey in order to isolate Iran, lessen EU

[18] Barton, *Energy Security*, 12.
[19] Gökay, *The Politics of Oil*, 35.
[20] Barton, *Energy Security*, 15.
[21] Gökay, *The Politics of Oil*, 35.
[22] Barton, *Energy Security*, 15.
[23] Gökay, *The Politics of Oil*, 35.

dependence on resources originating in Russia and Iran, diminish Russian control over Central Asian exports, and improve the economy of its NATO ally Turkey.[24]

While this theory draws a plausible political narrative, it does not describe how pipelines affect interstate conflict among the Central Asian republics themselves. For example, while it clearly explains the rationale behind why stakeholders built the problematic Baku-Tbilisi-Ceyhan pipeline, it does not discuss the impact the pipeline has had on the relations between Azerbaijan, Georgia, and Turkey. The theory also does not answer whether the perceived relative geopolitical significance or insignificance of an existing pipeline affects the incidence of conflict among the participating states.

Restricting this theory of conflict over the flow of pipelines to regional actors indicates that planned pipelines can increase regional conflict, without any predictions about existing pipelines. Ali describes contested regionalism in the context of cross-border pipelines as a scenario in which "countries in a geographic region with scarce resources scramble for greater regional influence, producing more conflict than cooperation."[25] For instance, Saudi Arabia and Qatar have tried to unseat Syrian President Bashar al-Assad by funding Syrian rebels after Syria rejected a Qatari proposal to build a natural gas pipeline through Syria and Turkey to Europe, which would have threatened the ability of Syrian ally Iran to enter the natural gas market and decreased the Russian stranglehold over the gas market in the EU, in favor of a Iran-Iraq-Syria pipeline that avoids the Arabian Peninsula entirely.[26] However, the contested regionalism literature is silent on the topic of the effect of existing pipelines on interstate conflict.

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[24] Ibid., 36–37.
[25] Ali, "Energizing Peace: The Role of Pipelines in Regional Cooperation," 6.
[26] Rob Taylor, "Pipeline Politics in Syria" (Armed Forces Journal, March 21, 2014), http://www.armedforcesjournal.com/pipeline-politics-in-syria/.

Recent scholarship by Ali claims that pipeline construction and operation can improve interstate relationships, even between adversaries or former adversaries, given the correct approach of policymakers. Ali argues that constructing and operating a pipeline create clear incentives for investors to protect their long-term investments and policymakers to secure their long-term energy security by integrating the development of the cross-border pipeline within a regional "economic and security framework," thus reducing conflict in the long-term.[27] Though pipelines cannot be a panacea for certain longstanding political disputes, Ali believes that actors must view pipelines as the "means" or "mechanisms", and not rewards, for cooperation.[28] One supporting example involves discussions between Oman, UAE, Qatar, and Saudi Arabia for the Dolphin Gas Project intending to create a pipeline to export Qatari North Field gas to Oman and UAE, which led to the resolution of significant border disputes among the four states.[29]

While the example deserves merit, the resolution of border disputes can hardly be considered a broad regional framework for economic and security cooperation. Rather than systematically evaluating the degree to which past policymakers and investors integrated historical cross-border pipelines within broader regional economic and security frameworks, the theory makes more of a rational plea for doing so in the future. Even though Ali does not make the argument, a clear counterexample decreases the credibility of the argument that a strong regional framework, or even similar institutions among the participants, is necessary for improving cooperation: the Temane-Secunda natural gas pipeline operating since 2004 between former Cold War adversaries Mozambique and South Africa, "whose economies and legal frameworks are not integrated to any great

[27] Ali, "Energizing Peace: The Role of Pipelines in Regional Cooperation," 5.
[28] Ibid., 18.
[29] Ibid., 13.

extent," has improved interstate cooperation and arguably decreased the likelihood of conflict.[30] Later in this chapter, the case study of the expansion of the Bratstvo natural gas pipeline between the USSR and West Germany during the Cold War will also demonstrate the possibility for conflict reduction without regional frameworks.

Overall, little can be taken away from the pipeline literature, except that pipelines can often cause internal conflict within states over proper distribution of profits, can be the subject of geopolitical tensions during the planning stages, and should warrant greater regional integration for long-term investment maturation and energy security. Therefore, this chapter delves into political economy literature to explain how the economic fundamentals of pipelines introduce economic interdependence and the "hold up" problem among participating states, which should affect the incidence of conflict.

Economic Fundamentals of Pipelines

Besides establishing a large amount of economic trade, all types of pipelines possess five core economic characteristics that differentiate them from other forms of infrastructure. First, pipelines are a choke-point in a longer energy value chain, as Makholm explains:

> "Certain kinds of investments are so sunk and dedicated to particular business relationships that they give rise to the risk of opportunistic 'holdup'… Pipelines display great asset specificity: immobile assets of great length tied to fuel producers, oil refiners, power plants, or local gas distributors."[31]

Because pipeline access is critical to not only the profitability of the pipeline, but also the profitability of "upstream" or production infrastructure and "downstream" or distribution

[30] Kandiyoti, *Pipelines*, 27.
[31] Jeff D. Makholm, *The Political Economy of Pipelines: A Century of Comparative Institutional Development* (Chicago ; London: The University of Chicago Press, 2012), 4.

infrastructure,[32] expected access to a pipeline is vital for almost any participant at any tier of the energy supply chain. Even though the possibility of a "hold-up" typically compels producers, pipeline owners and operators, and distributors to vertically integrate, political and economic circumstances often result in fragmented ownership, expropriation, or anti-competitive behavior. For instance, most cross-border pipelines in Eastern Europe and Central Asia have fragmented ownership because the post-Soviet states gained individual ownership of the portions of the old Soviet pipeline network that crossed into their territory; this unfortunate ownership structure has resulted in "political blackmail" at the ends of held-up pipelines in Ukraine and Russia.[33] Even if a state does not technically own the portion of a pipeline within its territory, states can "hold up" a pipeline to induce more favorable political behavior or economic terms. For example, Syria repeatedly held up the Iraq-Syria Kirkuk-Baniyas pipeline for larger transit fees and preferential oil off-take terms and eventually nationalized Iraqi pipeline assets in Syria in 1972.[34] Of course, repeated "hold ups" by particular state result in long-term ramifications – consider active efforts by Russia and Germany to circumvent Ukraine for natural gas transport, such as building the high-capacity yet expensive Nordstream AG submarine pipeline through the Baltic Sea directly from Russia to Germany in 2011 instead of simply upgrading the existing Bratstvo pipeline that runs through Ukraine.[35] Still, due to high asset specificity, pipelines are vulnerable to state interference in the medium term.

[32] Stevens, "Cross-Border Oil and Gas Pipelines: Problems and Prospects," 19.
[33] Kandiyoti, *Pipelines*, 11.
[34] Ibid., 65.
[35] Jeronim Perović, Robert W. Orttung, and Andreas Wenger, eds., *Russian Energy Power and Foreign Relations: Implications for Conflcit and Cooperation*, CSS Studies in Security and International Relations (London ; New York: Routledge, 2009), 170.

Second, pipelines require high fixed costs during construction but low variable costs during operation.[36] Due to the mismatch in fixed costs and variable costs, pipelines exhibit the "obsolescing bargain" in which the bargaining power over the terms of a pipeline shift from MNEs and foreign investors who can withhold their investments at any point during the planning and construction phase to the governments of states in which pipelines run once construction is finished and operation has commenced.[37] To illustrate, governments of states that possess large amounts of oil or natural gas reserves typically do not possess the capital, materials, or technological know-how to construct a pipeline – this is one of the reasons why neither Iraq nor Iran have been able to fully develop their oil and natural gas resources under the weight of international sanctions. Therefore, in the planning stages, MNEs and foreign investors possess the greater share of bargaining power. However, once a pipeline has begun operating, bargaining power shifts to the state, which can expropriate and operate pipelines even at a loss, as long as the revenues cover the variable costs. After all, states typically do not bear the brunt of the fixed upfront investment.

Third, pipelines exhibit economic features similar to those of natural monopolies. Makholm explains why:

> "The capacity within a pipeline [is] roughly π times a *squared function* of its radius. If the cost of the material for the pipe is roughly π times a *linear* function of that radius, then the average cost of pipeline capacity declines relentlessly with larger pipelines, as cost rises linearly while capacity rises exponentially. That means that a single pipeline is the least expensive way to serve the market for any conceivable quantity shipped – the definition of a *natural monopoly*."[38]

[36] Stevens, "Cross-Border Oil and Gas Pipelines: Problems and Prospects," 15.
[37] Raymond Vernon, "Sovereignty at Bay: The Multinational Spread of U. S. Enterprises," *The International Executive* 13, no. 4 (1971): 1–3, doi:10.1002/tie.5060130401.
[38] Makholm, *The Political Economy of Pipelines*, 29.

In practice, pipelines are not exactly natural monopolies due to geographical, political, and regulatory considerations. For example, during the operation of a cross-border natural gas pipeline from country A to country B, a rival gas field could be discovered in country A; if the rival gas field is easier to develop than the current gas field, or if the rival gas field is more accessible from country B than the current gas field, then it may actually be economically-feasible to build a new pipeline. At the same time, extensive exploration of oil and natural gas reserves within states by MNEs, intense debates over pipeline routes, and significant involvement by the state prior to the finalization of any project and the construction of a pipeline means that in at least the short to medium term, participating states will be dependent on the pipeline, and therefore one another, for energy and for revenues.

Fourth, the long life of projects, typically around twenty to forty years, provides little flexibility to any of the parties involved. At the outset, either participant surely expects to be dependent to some degree on the other participants for at least a fraction of the lifetime. At the same time, the stakeholders are held "hostage to fortune"; for instance, changes in oil or natural gas prices change the value of throughput, which may convince some of the participating states that the terms of transit should change, whether that involves a state demanding higher transit fees in the event of rising resource prices[39] or a state demanding the right to off-take greater volumes of crude oil as a transit fee in kind in the event of falling oil prices. Not all may agree, which may lead to state interference and conflict. To operate for a long lifetime, cross-border pipelines typically include contracts that create interdependence; for instance, many natural gas pipeline

[39] Stevens, "Cross-Border Oil and Gas Pipelines: Problems and Prospects," 17.

agreements today involve "take-or-pay" clauses that bind the consuming state to paying for some minimum amount of natural gas transmitted via pipeline by the producing state, regardless of whether the consuming state actually needs the natural gas.[40]

Fifth and finally, pipeline construction and operation require heavy state involvement. States must clear land for pipeline use[41] and intervene in the event of market failure to guarantee supplies of energy. Though other stakeholders may see pipelines as a purely commercial project, government stakeholders are vulnerable to injecting both noncommercial and other commercial considerations into behavior regarding pipeline projects. This increases the likelihood of state interference in cross-border pipelines.

Cross-border and transit pipelines in particular possess additional features that likely render them more susceptible to "hold up" than the domestic pipeline. As discussed in the previous chapter, cross-border pipelines involve multiple legal regimes, and energy transit has yet to be normalized by international law and institutions, meaning that no clear and sustainable mechanism typically exists for conflict resolution over the terms of transit. Stevens asserts that market efficiency, competition, and similarities in legal structures, such as in the OCED, minimize the likelihood of interstate conflict over pipelines, as long as property rights are secure in those states.[42] Even if this is true, a significant proportion of high-capacity pipelines cross states with starkly different legal regimes, which is why the "multilateral challenge" is so heavily-studied in pipeline

[40] Ibid., 13.
[41] Kandiyoti, *Pipelines*, 46–48.
[42] Stevens, "Cross-Border Oil and Gas Pipelines: Problems and Prospects," 21.

literature.[43] Transit pipelines add an additional complication by involving at least one third-party state that could "hold up" the pipeline to satisfy interests that may differ from those of either the exporting or importing states. At the same time, transit states might be dependent on off-take from the pipeline to satisfy their own energy demand or revenues from transit fees for debt reduction, fostering economic interdependence.[44]

Therefore, the economic fundamentals of pipelines, coupled with the multilateral nature of the cross-border and transit pipelines today, facilitate economic interdependence among the participating states yet create the possibility of opportunistic "hold ups". Before investigating two cases to show clear examples of economic interdependence and vulnerability, this chapter reviews existing political economy literature that explains the effects of economic interdependence and the "hold up" on interstate conflict.

Economic Interdependence: the "Commercial Peace"

The effect of economic interdependence on interstate conflict is one of the most studied and controversial topics in the literature. Originally, numerous studies empirically demonstrated that democracies rarely engaged in conflict with one another, thus creating the notion of the "liberal peace." Oneal and Russett extended this "liberal peace" to a "commercial peace" in 1996 by empirically demonstrating that economic interdependence reduced interstate conflict, even when controlling for other variables

[43] More details can be found in documents compiled by the Energy Charter, such as "Energy Transit - The Multilateral Challenge" (G8 Energy Ministerial Meeting Moscow: Energy Charter, April 1, 1998). "Bringing Gas to Market," and "Bringing Oil to Market."
[44] Stevens and Royal Institute of International Affairs, *Transit Troubles*, 8.

known to drive conflict, such as democracy levels.[45] At around the same time, other empirical studies showed that the relationship between economic interdependence and conflict was actually curvilinear, and that extreme levels of economic interdependence between pairs of countries increased the likelihood of conflict.[46,47] Follow-up work by Oneal, Gartkze, and Li accounted for the discrepancy by showing that different definitions of economic interdependence resulted in opposite effects on the incidence of interstate conflict. They found that increasing the trade dependence of country A on country B, or the amount of bilateral trade between A and B normalized by the GDP of A – the most politically relevant definition of economic interdependence – almost always decreased the likelihood of conflict between states.[48,49] Moreover, follow-up meta-studies of the literature found that the vast majority of empirical studies have demonstrated the same decrease in interstate conflict with increases in trade dependence, even if the actual theoretical mechanisms had yet to be fully understood.[50,51]

Previous scholars had already described the effects of economic interdependence in liberal and realist terms, where liberals believed that benefits of trade raised the costs of conflict and provided an incentive to avoid conflict, and realists believed that "the

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[45] J. R. Oneal et al., "The Liberal Peace: Interdependence, Democracy, and International Conflict, 1950-85," *Journal of Peace Research* 33, no. 1 (February 1, 1996): 11–28, doi:10.1177/0022343396033001002.
[46] K. Barbieri, "Economic Interdependence: A Path to Peace or a Source of Interstate Conflict?," *Journal of Peace Research* 33, no. 1 (February 1, 1996): 29–49, doi:10.1177/0022343396033001003.
[47] M. S. de Vries, "Interdependence, Cooperation and Conflict: An Empirical Analysis," *Journal of Peace Research* 27, no. 4 (November 1, 1990): 429–44, doi:10.1177/0022343390027004007.
[48] Erik Gartzke and Quan Li, "Measure for Measure: Concept Operationalization and the Trade Interdependence-Conflict Debate," *Journal of Peace Research* 40, no. 5 (September 1, 2003): 553–71, doi:10.1177/00223433030405004.
[49] John R. Oneal, "Measuring Interdependence and Its Pacific Benefits: A Reply to Gartzke & Li," *Journal of Peace Research* 40, no. 6 (November 1, 2003): 721–25, doi:10.1177/00223433030406007.
[50] E. M. McMillan, "Independence and Conflict," *Mershon International Studies Review* 41, no. 1 (May 1997): 33–58, doi:10.1111/1521-9488.511997051.
[51] Oneal, "Measuring Interdependence and Its Pacific Benefits."

potential costs of being cut off can push states to war to secure vital goods."[52] Early empirical tests with smaller sample sizes showed that increasing measures of the benefits of economic interdependence reduced the incidence of interstate conflict, whereas increasing measures of the costs increased the incidence of interstate conflict.[53] Copeland identified a new causal variable, the expectations of future trade, in his 1996 effort to resolve the tension between the potential benefits and costs of trade.[54] Copeland posits that high economic interdependence and high expectations of future trade provides states with an incentive to maintain the liberal peace, whereas high economic interdependence and low expectations of future trade provide states with an incentive to act quickly and violently against one another to secure resources.

Ultimately, the empirical evidence points in the direction of the liberal argument: increasing levels of democracy, joint membership in international government organizations, and economic interdependence defined as trade dependence each led to a marked decrease in interstate conflict between 1885 and 1992[55] - a hypothesis supported by recent sophisticated analyses of economic and noneconomic forms of interdependence on monadic, dyadic, and systemic conflict[56] and studies that limited their analysis of economic interdependence and conflict to particular regions of the world.[57] Therefore, one can expect economic interdependence to decrease the incidence of interstate conflict

[52] Dale C. Copeland, "Economic Interdependence and War: A Theory of Trade Expectations," *International Security* 20, no. 4 (1996): 6, doi:10.2307/2539041.
[53] Mark J. Gasiorowski, "Economic Interdependence and International Conflict: Some Cross-National Evidence," *International Studies Quarterly* 30, no. 1 (March 1986): 23, doi:10.2307/2600435.
[54] Copeland, "Economic Interdependence and War."
[55] Bruce M. Russett and John R. Oneal, *Triangulating Peace: Democracy, Interdependence, and International Organizations* (New York: Norton, 2001).
[56] Zeev Maoz, "The Effects of Strategic and Economic Interdependence on International Conflict Across Levels of Analysis," *American Journal of Political Science* 53, no. 1 (January 2009): 223–40, doi:10.1111/j.1540-5907.2008.00367.x.
[57] H. G. Beyene, "Does International Trade Reduce Political Disputes?," *Foreign Trade Review* 50, no. 2 (May 1, 2015): 99–117, doi:10.1177/0015732515572058.

by raising the costs to conflict, increasing global economic well-being and satisfaction with the status quo, and building mutual trust through repeated successful transactions.[58] Therefore, if pipelines do introduce economic interdependence, it is plausible for them to reduce interstate conflict.

Foreign Direct Investment: "Hold Ups" and Expropriation

Even though little research has studied the effect of a government-led "hold up" or expropriation of foreign infrastructure on interstate conflict, it is quite obvious that doing so would, at the very least, negatively impact relations with the other state. For instance, the Egyptian nationalization of the British and French-owned Suez Canal in 1956 exacerbated mounting tensions between Egypt and the UK, France, and Israel to the point where the UK, France, and Israel attempted to invade Egypt to overthrow its president.[59] Similarly, Gazprom's "hold up" of a pipeline transporting natural gas to Ukraine due to a dispute over new prices in 2005 increased tensions between Russia and Ukraine, as Ukrainians began their first public boycott of Russian goods. In fact, pipeline-specific literature, legal challenges, and economics reviewed earlier in this chapter adequately point to the extreme vulnerability of pipelines to either "hold up" or expropriation. Therefore, instead of demonstrating that state interference can cause interstate conflict, this section focuses on contextualizing cross-border pipelines within the larger foreign direct investment literature.

[58] M. D. Ward, "Book Review," *Comparative Political Studies* 35, no. 4 (May 1, 2002): 484–88, doi:10.1177/0010414002035004005.
[59] "The Suez Crisis, 1956," *Office of the Historian: US Department of State*, accessed May 20, 2016, https://history.state.gov/milestones/1953-1960/suez.

Recall that firms interested in accessing foreign markets or natural resources located in foreign territory face a dilemma of internationalization versus internalization.[60] Internationalization appeals to firms merely interested in contracting with local businesses to produce or distribute goods in a foreign market for extra profits without having to acquire foreign firms or purchase and operate new infrastructure. On the other hand, internalization can appeal for two reasons. First, internalization protects the firm from being "held up" by a foreign state or contractor that blocks a critical step in the firm's supply chain. For instance, given a concentrated market structure that is typical due to the monopolistic aspects of pipelines, a natural gas distributor entirely dependent on the supply from one transmission pipeline originating in a neighboring state arguably faces the high transaction costs of repeatedly outbidding other distributors for a share of the finite supply. On the other hand, should the natural gas distributor dominate the domestic market, transmission pipeline operators may face high transaction costs in bargaining with the distributor. Either case involves the extraordinary pressure to internalize another aspect of the production, transmission, or distribution process in the oil and natural gas industries and vertically integrate.[61]

The second firm pressure involves internalizing to take advantage of intangible assets such as technology, intellectual property, and credibility, which cannot be sold or contracted out, to increase profits. After all, an increasing number of major pipeline projects today are either planned or operated by a large number of MNEs with the technological know-how for exploration, decision-making, production, and transport. For

[60] Pol Antràs and Stephen R. Yeaple, "Multinational Firms and the Structure of International Trade," in *Handbook of International Economics*, vol. 4 (Elsevier, 2014), 55–130, http://linkinghub.elsevier.com/retrieve/pii/B9780444543141000021.
[61] Makholm, *The Political Economy of Pipelines*, 4.

instance, following eight major oil discoveries in Iraqi Kurdistan, more than 40 MNEs signed 37 contracts with the KRG to pour $10 billion into exploration and production facilities, such as new refineries and power plants.[62]

As a result of these twin pressures, firms in the oil and natural gas industries often vertically and horizontally integrate abroad, which renders them particularly vulnerable to foreign expropriation, a common factor in extractive industries.[63] Historically, states with natural resource wealth often act aggressively towards other regional actors, as control over the resource endows the state with funds for weaponry and the political autonomy to act with few constraints.[64] Despite this historical risk of expropriation, it is possible that the current risk has significantly diminished. For instance, host countries have become more open and competitive in recent years to signing bilateral investment treaties.[65] Despite lingering legal questions about the degree to which international arbitration should or should not prioritize the sovereignty of the host state against its obligations to MNEs,[66] in recent years, host countries have extended to investors the protection of contractual rights and the right to international arbitration.[67]

Even so, an empirical analysis of the effect of historical cross-border pipelines on interstate conflict should reveal the higher past risk of expropriation in the form of

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[62] Michael M. Gunter, *Out of Nowhere: The Kurds of Syria in Peace and War* (London: Hurst & Company, 2014), 50.
[63] Quan Li, "Democracy, Autocracy, and Expropriation of Foreign Direct Investment," *Comparative Political Studies* 42, no. 8 (August 1, 2009): 1098–1127, doi:10.1177/0010414009331723.
[64] Jeff D. Colgan, "Oil and Revolutionary Governments: Fuel for International Conflict," *International Organization* 64, no. 04 (October 2010): 661–94, doi:10.1017/S002081831000024X.
[65] Ravi Ramamurti, "The Obsolescing 'Bargaining Model'? MNC-Host Developing Country Relations Revisited," *Journal of International Business Studies* 32, no. 1 (March 2001): 23–39, doi:10.1057/palgrave.jibs.8490936.
[66] Nougayrède, "Binding States."
[67] Zachary Elkins, Andrew T. Guzman, and Beth A. Simmons, "Competing for Capital: The Diffusion of Bilateral Investment Treaties, 1960–2000," *International Organization* 60, no. 04 (October 2006), doi:10.1017/S0020818306060279.

interstate conflict. Moreover, note that internalization may not always be possible; if the cross-border pipeline follows the traditional "patchwork" model,[68] the owner of one national section may not be able to purchase a second national section if the state in charge of the second section prohibits the purchase, leaving both owners susceptible to a "hold up" by the other – consider the natural gas pipelines that Russia and Ukraine inherited from the Soviet Union. Generally, whether cases of expropriation and "hold up" are prevalent enough in the pipeline industry to cause noticeable interstate conflict remains to be seen, as does the actual effect of the energy and economic interdependence introduced by pipelines. The final sections of this chapter illustrate clear examples of both economic interdependence caused by pipelines and both expropriation and "hold up" caused by pipelines to illustrate the plausibility of either effect.

Past Pipelines: Cases for Economic Interdependence and the "Hold Up"

To demonstrate how a cross-border pipeline can shape the relationship between two states, I conducted two case studies of cross-border pipelines. Each case investigates a single cross-border oil and natural gas pipeline. Because such projects are typically self-contained once commissioned, meaning that they possess their own chronological narrative, the scope of any particular pipeline project is narrow enough to be studied within a single case. The dependent variable or outcome examined by this thesis is the effect of the pipeline on the relationship between the participating states. Admittedly, diagnosing the relationship between states at any point in time poses challenges, and asserting that one particular corner of multilateral policy shaped multilateral relations

[68] Recall the traditional "patchwork" model treats a cross-border pipeline as a set of connected domestic pipelines, with each domestic or national section of this set being under the jurisdiction and regulation of the respective state.

poses even greater challenges. To adjust for this problem, the case studies investigate two pipelines whose effect on the relations of the participating states has been the extensive study of contemporary news media, intelligence analyses, and scholarly literature. Moreover, these sources broadly agree on whether the cross-border pipeline ultimately created beneficial economic interdependence, thus fostering cooperation among the participating states, or vulnerabilities that the participating states sought to exploit to alter the terms of transit. Simple independent variables, including the relevant stakeholders, their rationale for pursuing a cross-border pipeline, the terms of the agreement, and challenges in operating the project can illustrate how these effects develop.

The first case shows how the historical Urengoy-Pomary-Uzhgorod natural gas pipeline, which upgraded the capacity of the existing Bratstvo pipeline between the USSR and West Germany, generated beneficial economic interdependence that increased the credibility of either state, mitigated tensions from 1983 to 1991, and set the foundation for German dependence on Russian gas after the fall of the USSR. In stark contrast, the Greater Nile Oil Pipeline, which transports crude oil produced in South Sudan to Port Sudan in Sudan for export, created clear vulnerabilities that either state sought to exploit after the South Sudan attained independence in 2011. These two extraordinarily different pipelines are orthogonal in the sample space and will be informative in the following heuristic setting.

Urengoy-Pomary-Uzhgorod Pipeline: the Case for Interdependence

The pipeline itself: a brief resume

Commissioned in 1983, the Urengoy-Pomary-Uzhgorod Pipeline (or Trans-Siberian Pipeline) was the primary natural gas export pipeline of the USSR during the

final years of the Cold War. With an initial net physical capacity of 29 billion cubic meters per year, the $22 billion pipeline transported gas over 4650 kilometers from the Siberian "supergiant" field at Urengoy to Uzhgorod, where it fed into the existing Bratstvo (Brotherhood) pipeline that crossed into Czechoslovakia and West Germany to connect to the west European natural gas transmission network. West Germany and the USSR increased their interdependence and overcame political issues such as the status of West Berlin and a unilateral American embargo on the sale and use of American pipeline parts and technology in the pipeline. The natural gas pipeline helped West Germany secure a degree of energy security and provided the USSR with the currency required to maintain imports. This cooperation laid the foundation for the natural gas relationship between Russia and Germany today.

The stakeholders: the who's who of the pipeline

Stakeholders in West Germany included the Bonn government, natural gas distributors led by Ruhrgas, steel pipe makers led by Mannesman, and banks and credit firms led by Deutsch Bank of Frankfurt.[69] High-level approval of the project by Soviet President Leonid Brezhnev and West German Chancellor Helmut Schmidt indicates the significance of the pipeline to the stakeholders in both states.[70]

The stakeholders: the prior relationship

During the Cold War, West Germany and the Soviet Union were members of two opposing political and economic blocs. Political tensions existed over the status of Berlin,

[69] John Tagliabue, "West Germans Planning Soviet Pipeline Talks," *The New York Times*, July 5, 1980, ProQuest Historical Newspapers: The New York Times.
[70] Wallace J. Thies, *Why NATO Endures* (New York: Cambridge University Press, 2009), 244.

as well as the future relationship of West Germany and East Germany.[71] At the same time, the economies of the Organization for Economic Co-operation and Development, of which West Germany was a member, and the Council for Mutual Economic Assistance, comprised of Eastern European states and the USSR, remained separated in terms of bilateral trade.[72]

West Germany and the USSR improved their trading relationship through the detente years of the 1970s, particularly through the first Soviet gas exports to West Germany in 1968.[73] Initially, West German natural gas distributor Ruhrgas AG contracted with the USSR to purchase and distribute 12 billion cubic meters of natural gas a year.[74] Following early success, West Germany agreed to provide enough pipe and credit on generous terms to enable the USSR to extend the Bratstvo pipeline to West Germany by 1973.[75] Bösch argues that this arrangement constituted "the most significant transaction between the East and the West up to this point" and had already been "completed well before Brandt's treaties with Moscow took effect and can be seen as an integral part of the treaties."[76] Despite providing value and increasing mutual trust between West Germany and the USSR – enough to arguably demonstrate the viability of *Ostpolitik* and détente with the USSR – the arrangement paled in comparison to the Urengoy-Pomary-Uzhgorod pipeline. Both the visibility of and trade involved with this particular pipeline were significantly larger due to the unprecedented volumes of gas,

[71] Stern, "Gas Pipeline Co-Operation between Political Adversaries: Examples from Europe."
[72] Ibid., 1.
[73] Thies, *Why NATO Endures*, 243.
[74] Lawrence Fellows, "Soviet Sets Terms to Sell Gas To West Germany," *The New York Times*, December 1, 1969, ProQuest Historical Newspapers: The New York Times.
[75] Bösch, Frank, "Energy Diplomacy: West Germany, the Soviet Union and the Oil Crises of the 1970s," 2014, 170, doi:10.12759/hsr.39.2014.4.165-185.
[76] Ibid.

mass of pipe, pumping equipment, installation expertise, and Western credit involved in financing, building, and operating the pipeline.[77]

The rationale: why a pipeline, and why then

West Germany pursued the pipeline project in the early 1980s to secure an energy supply through the end of the twentieth century. Contemporary media[78], a declassified CIA report,[79] and recent scholarly analysis[80] concur that the 1973-1974 OPEC oil embargo convinced OECD countries, including West Germany, to begin diversifying their hydrocarbon portfolios away from oil, whose supply and price could effectively be controlled by OPEC. As a result, West Germany sought to have natural gas constitute 30 percent of its energy consumption as a source.[81] However, West Germany failed to find reliable natural gas imports from elsewhere to replace crude oil imports from the Persian Gulf during the 1970s. After the 1979 revolution, the Iranian government canceled a plan to export Iranian natural gas via a pipeline through the southern republics of the Soviet Union and into West Germany,[82] depriving West Germany of seven percent of its natural gas use anticipated for 1985.[83] At the same time, Algeria halted a proposal to provide 19 percent of West German natural gas use through LNG due to feasibility concerns.[84] Even worse, the Netherlands, which supplied 38 percent of West Germany's natural gas at the time, decided against renewing its contract, which would be expiring in 1990.[85] Norway's

[77] Tagliabue, "West Germans Planning Soviet Pipeline Talks."
[78] Ibid.
[79] John Hardt and Donna Gold, "The Soviet Gas Pipeline in Perspective," Special National Intelligence Estimate (Central Intelligence Agency, 1982), 28.
[80] Stern, "Gas Pipeline Co-Operation between Political Adversaries: Examples from Europe," 1.
[81] Bösch, Frank, "Energy Diplomacy," 170.
[82] Thies, *Why NATO Endures*, 243.
[83] Tagliabue, "West Germans Planning Soviet Pipeline Talks."
[84] Ibid.
[85] Ibid.

production of North Sea oil would be "interesting only in the long run" to West Germany; therefore, West Germany had no other alternatives but to seek "the biggest natural gas deal to date" by doubling its imports of Soviet natural gas.[86]

Secondary concerns included finding demand for West Germany's steel pipe industry, which had been floundering in an increasingly competitive global market,[87] and improving political relations with the Eastern bloc. In particular, West Germany and other West European states sought to restore détente in Europe after the events of 1979, such as the Soviet invasion of Afghanistan, intensified tensions between the blocs, and believed that "economic and other ties with the USSR will influence Soviet behavior."[88] However, political motivations were subordinate to economic incentives; Högselius writes that "in the absence of profit expectations, neither the USSR nor Western Europe's importers would have supported the creation of the system."[89]

The USSR sought the pipeline project in order to earn hard currency for spending. Almost all Soviet exports began to waver due to lagging development and production in the 1970s, particularly in the oil industry.[90] As a result, Western banks became increasingly reluctant to provide credit to Soviet industries.[91] A decline in exports created a "strained hard currency position" for the USSR and limited the capacity of the USSR to purchase and import foreign hardware and technology.[92] At the same time, Soviet gas production rose rapidly due to investment into internal pipeline networks and Siberian

[86] Bösch, Frank, "Energy Diplomacy," 179.
[87] Tagliabue, "West Germans Planning Soviet Pipeline Talks."
[88] Hardt and Gold, "The Soviet Gas Pipeline in Perspective," 4.
[89] Per Högselius, "Introduction," in *Red Gas*, Palgrave Macmillan Transnational History Series (Palgrave Macmillan US, 2013), 1–11, http://link.springer.com/chapter/10.1057/9781137286154_1.
[90] Stern, "Gas Pipeline Co-Operation between Political Adversaries: Examples from Europe," 2.
[91] Hardt and Gold, "The Soviet Gas Pipeline in Perspective."
[92] Ibid., 20.

gas development. Past successful experience of supplying Ruhrgas AG and thus West Germany with natural gas since the 1970 Ruhrgas deal demonstrated the viability of a larger pipeline project in securing hard currency. The USSR also had recognized the importance of the West German market as far back as 1969, when the USSR and East Germany independently made bids to supply natural gas and oil to West Germany via pipelines and thus corner the Western energy markets.[93] The CIA analysis of the pipeline project noted that the "best hope" of the USSR for earning hard currency was "to secure the cooperation of Western Europe in building large new pipelines" for gas, and thus the USSR was willing to commit volume to West European demand. Since the USSR could earn $8 billion a year from gas deliveries through the Urengoy-Pomary-Uzhgorod pipeline, the Soviet press lauded the agreement as the "deal of the century."[94]

The fine-print: terms of the initial agreement

On face value, the reported terms of the pipeline agreement suggest significant Soviet flexibility in accommodating West German interests. West German natural gas firm Ruhrgas desired to resell Soviet natural gas at prices competitive with the global oil price; the agreement enabled Ruhrgas to purchase Soviet gas at "crude parity pricing," which indexed the price to the lower-variance prices of a particular crude oil flavor.[95] Conservative pricing estimates at the time indicate that the highest possible price Ruhrgas would have to pay for Soviet gas would be at least ten percent cheaper than the global oil price.[96] West German pipeline maker Mannesman hoped to stay afloat in an increasingly

[93] David Binder, "Soviet Offers to Extend Pipeline to West Germany," *The New York Times*, May 6, 1969, ProQuest Historical Newspapers: The New York Times.
[94] Tagliabue, "West Germans Planning Soviet Pipeline Talks."
[95] Ibid.
[96] Hardt and Gold, "The Soviet Gas Pipeline in Perspective," 29.

competitive global steel industry by increasing production; the agreement tasked Mannesman with providing most of the steel pipe for the pipeline.[97] The agreement guaranteed natural gas supply to West Germany for the next 25 years,[98] providing the state with a semblance of energy security given the earlier failures of the Iranian and Algerian prospects, as well as the inability of the Netherlands to renew its gas supplies. West Germany even received a single-use option to reduce the baseline contracted annual volume by 20 percent permanently and an annual-option to reduce purchased volume by 20 percent each year.[99]

Thus, the arrangements provided West Germany with a guaranteed natural gas supply for the foreseeable future at volumes of Ruhrgas' choosing and at prices guaranteed to be lower than the spot price for crude. At the same time, with guaranteed German credit and hard currency, the USSR could import new technologies and further develop its Siberian gas reserves and internal pipeline network for the foreseeable future.

Upping the ante: challenges faced by stakeholders

Wary of any trade deals that would provide the Soviet Union with hard currency that would extend its lifetime, as well as deals that would render Western Europe dependent on Soviet resources, the United States placed immense pressure on West Germany and Western Europe to avoid the deal.[100] This pressure culminated in an embargo on the sale and use of American pipeline material and technology for the Urengoy-Pomary-Uzhgorod pipeline during the Reagan administration. As predicted by

[97] Theodore Shabad, "Work Proceeding on Soviet Pipeline," *The New York Times*, February 21, 1982, ProQuest Historical Newspapers: The New York Times.
[98] Hardt and Gold, "The Soviet Gas Pipeline in Perspective," 29.
[99] Ibid.
[100] Stern, "Gas Pipeline Co-Operation between Political Adversaries: Examples from Europe," 3.

the CIA, Western European states resisted the US embargo and sanctions by ordering their firms to move forward with the pipeline.[101] Eventually, the United States relented and lifted its embargo and sanctions,[102] but not without the incident seriously fraying and testing the trans-Atlantic Western alliance.[103] In a similar vein, other members of CMEA had already expressed frustration at the explicit attempts by the USSR to bypass CMEA members, particularly East Germany, for trade with West Germany and Western Europe.[104] However, the profitability of the gas pipeline was such that the USSR was willing to exert significant pressure on East Germany to not only accept the new status quo, but also allow the creation of an extension line from East Berlin into West Berlin.[105] Thus, the primary stakeholders overcame the main challenges they faced in constructing and operating the pipeline.

The stakeholders: evolution in perspectives

Natural gas deliveries from the Soviet Union to West Germany only intensified from 1983 to 1991. By 1989, Soviet deliveries met 30 percent of West Germany's gas demand, and Soviet supply to West Berlin proceeded without any issues.[106] Brezhnev had said in 1973 that the 1973 Bratstvo deal would secure cooperation between West Germany and the USSR for "30, even 50 years."[107] The Urengoy-Pomary-Uzhgorod pipeline accomplished Brezhnev's vision by tying the ability of the USSR to import

[101] Hardt and Gold, "The Soviet Gas Pipeline in Perspective."
[102] Stern, "Gas Pipeline Co-Operation between Political Adversaries: Examples from Europe," 3.
[103] Antony J. Blinken, *Ally versus Ally: America, Europe, and the Siberian Pipeline Crisis* (New York: Praeger, 1987).
[104] Fellows, "Soviet Sets Terms to Sell Gas To West Germany."
[105] Stern, "Gas Pipeline Co-Operation between Political Adversaries: Examples from Europe," 2–3.
[106] Ibid., 3.
[107] Bösch, Frank, "Energy Diplomacy," 171.

technology and make investments to the interests of not only the West Germany government, but also West Germany firms and banks.

The impact of the pipeline on interstate relations

As Blinken wrote in 1987:

> "Both East and West invested heavily in a project that promises each side potentially important long-term benefits. A thick strand in the web of commerce, the pipeline should ensure that engineers, businessmen, economic planners, and government leaders maintain a dialogue as they seek to continue the supply of energy, on the one hand, and the inflow of hard currency and technology, on the other. By promoting a healthy degree of economic interdependence between the antagonistic systems, projects such as the Siberian pipeline pull the East-West relationship one step back from catastrophic conflict and push it one step ahead toward cautious coexistence and even cooperation."[108]

Both West Germany and the Soviet Union overrode their obligations to their allies and economic partners in constructing and operating the Urengoy-Pomary-Uzhgorod natural gas pipeline. Spurred by the success of earlier natural gas deals, both states primarily pursued the pipeline for economic purposes, with West Germany securing its energy supply into the twenty-first century, and the Soviet Union securing a valuable source of hard currency. Though this pipeline was not the first to be constructed between West Germany and the Soviet Union, it was the first pipeline to generate an international response in the form of a US embargo due to its scale and level of commitment required by both stakeholders. Its success almost certainly set the foundation for future Soviet-German and Russian-German natural gas cooperation, particularly through the Northern Lights and Yamal-Europe natural gas pipelines.[109] Moreover, the tone of Soviet rhetoric towards Bonn changed entirely through the course of this pipeline period, from Brezhnev declaring Bonn bureaucrats to be "Nazi revanchists" in the early 1970s to Brezhnev

[108] Blinken, *Ally versus Ally*, 149–150.
[109] Perović, Orttung, and Wenger, *Russian Energy Power and Foreign Relations*, 170.

flying to West Germany in 1981 and declaring that Bonn was "a partner for peace."[110] Overall, the economic interdependence generated by the pipeline served as a "confidence building" measure for future general trade and improved political ties and as a deterrent to European conflict.[111]

Greater Nile Oil Pipeline: the Case for the "Hold Up"

The pipeline itself: a brief resume

Commissioned in 1999, the Greater Nile Oil Pipeline (GNOP) was Sudan's only crude oil export pipeline until 2011. With a net physical capacity of more than 450,000 barrels a day, the $3 billion pipeline transported oil over 1500 kilometers from the Heglig oil field to an export terminal on the Red Sea at Port Sudan.[112] As the development and export of Sudanese oil provided the revenue and popular acquiescence necessary for the ruling Arab-Islamist government of Sudan under President Bashir to prosecute wars in Darfur and in southern Sudan against mostly African Christians and animists, rebel groups repeatedly sabotaged GNOP. In January 2011, GNOP became a cross-border pipeline after the establishment of South Sudan left the landlocked country in control of 75 percent of Sudan's original oil reserves and left Sudan with Port Sudan, the only port with a terminal for oil export. Since then, Sudan and South Sudan have regularly conflicted over the terms of transiting oil through GNOP; in particular, South Sudan has repeatedly "held up" the pipeline in response to perceived Sudanese aggression or terms of transit that would harm South Sudan's economy.

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[110] Flora, "FOREIGN AFFAIRS; SOVIET-GERMAN BRIDGE," *The New York Times*, November 27, 1981, sec. Opinion, http://www.nytimes.com/1981/11/27/opinion/foreign-affairs-soviet-german-bridge.html.
[111] Bösch, Frank, "Energy Diplomacy," 180.
[112] "AP: Sudan Inaugurates Oil Pipeline," *Alexander's Gas & Oil Connections*, May 31, 1999, http://www.gasandoil.com/news/africa/b557d7bd49e223870a4ddce013c58f50.

The stakeholders: the who's who of the pipeline

The Greater Nile Petroleum Operating Company, a consortium of several petroleum firms, owns GNOP. GNPOC is currently owned 40 percent by the Chinese National Petroleum Company (CNPC), a Chinese stated-owned MNE, 30 percent by Petronas, a Malaysian state-owned MNE, 25 percent by ONGC, an Indian state-owned MNE, and 5 percent by Sudapet, the Sudanese state-owned MNE. Western firms sold their ownership stakes in GNPOC under pressure from human rights NGOs and the US. CNPC directly operates the pipeline. Because GNOP now begins in the Unity oil field, which is firmly under South Sudan's control, and GNOP travels mostly through Sudanese territory and terminates at the Sudanese port of Port Sudan, the governments of South Sudan and Sudan are the key stakeholders.

The stakeholders: the prior relationship

Simply put, Sudan and South Sudan shared negative, antagonistic, and frequently openly hostile relations at the moment of the January 2011 referendum. During most of British rule over Sudan, the colonial government separately administered the larger and more populous northern Sudan, dominated by culturally Arabic Muslims, and the smaller and less populous southern Sudan, dominated by culturally African Christians and animists. In the final decade of colonial rule, the British merged the two divisions into one administration, enabling the northern Sudanese elite to dominate the colonial bureaucracy. The First Sudanese Civil War erupted in 1955 between southern Sudanese

rebels afraid of northern oppression in a unified Sudan, during which the government bombed villages, massacred civilians, and enslaved children in southern Sudan.[113]

Though the civil war ended in 1972 with the Addis Ababa accord that guaranteed autonomy and freedom from infringement for southern Sudan, the Sudanese government violated the accord repeatedly. In 1983, President Gaafar Nimeiry abolished the southern autonomous region and declared Sudan an Islamic state. In response, the southern Sudanese rebelled under the auspices of the Sudan People's Liberation Army, instigating the Second Sudanese Civil War, which lasted until 2005, killed 2.5 million people, and displaced millions more.[114] International pressure and a stalemate forced the rebels and the government to agree to a Comprehensive Peace Accord that reinstituted autonomy for southern Sudan, planned a referendum for southern independence in 2011, and split central government oil revenues fifty-fifty between Sudan and the south. However, the accord postponed a resolution on the status of three border provinces, including the oil-rich Abyei, as well as future rent-distribution for oil sales.[115] Moreover, 99 percent of southern Sudanese voted for independence in the 2011 referendum.[116] In other words, South Sudan and Sudan had poor relations following 2011 due to lingering resentment over the past civil wars and unresolved political issues.

The rationale: why a pipeline, and why then

The withdrawal of Western firms in the 1980s due to the outbreak of the Second Sudanese Civil War and the United States designation of Sudan as a state sponsor of

[113] Jeffrey Gettleman, "After Years of Struggle, South Sudan Becomes a New Nation," *The New York Times*, July 9, 2011, http://www.nytimes.com/2011/07/10/world/africa/10sudan.html.
[114] Ibid.
[115] Jeffrey Gettleman, "Sudan and South Sudan Sign Accord, but Several Issues Are Unresolved," *New York Times*, September 28, 2012.
[116] Ros Wynne-Jones, "Happy Birthday South Sudan?," *The Independent*, July 6, 2012, http://www.independent.co.uk/news/world/africa/happy-birthday-south-sudan-7912244.html.

terror in 1993 left the development, production, and export of Sudanese oil open to Asian interests.[117] Those interests, primarily representing India, China, and Malaysia, desired to export Sudanese oil back to their home countries, necessitating overland transport via pipeline from the oil fields in southern and central Sudan to the coast for export. The resulting economic boom and government revenues enabled the Sudanese government to conduct its war against the south with little internal resistance. For this reason, the 2005 Comprehensive Peace Accord mandated fifty-fifty sharing of oil revenues to incentivize both sides to protect the pipeline.[118]

By 2011, at the moment of independence and the moment the pipeline became cross-border, 98 percent of the southern autonomous government's revenue came from oil sales. However, the new South Sudan was landlocked and needed to send oil to Port Sudan through the GNOP and through Sudanese territory. At the same time, Sudan relied on oil revenue to manage its significant debts caused by excessive government spending and the global recession. However, Sudan lost more than 75 percent of its oil reserves to the new South Sudan due to the new border.[119] As a result, either state needed infrastructure in the other state to generate revenue; either state needed revenue because poor development in both states meant that government assistance for food, fuel, and basic services was essential.[120] Finally, and perhaps most contentiously, both states desired sufficient revenues to fund their militaries to deter one another. For instance, the

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[117] Richard Nield, "Politics and Untapped Potential," *MEED: Middle East Economic Digest* 48, no. 28 (July 9, 2004): 29–31.
[118] Marc Lacey, "U.S. Urges Sudan to Divide Oil Income as Step to Peace," *New York Times*, May 5, 2002.
[119] Vincent Trivett, "Oil-Rich South Sudan Has Hours To Choose Between North Sudan, China And The U.S.," *Business Insider*, July 8, 2011, http://www.businessinsider.com/southern-sudan-independence-2011-7.
[120] "The New State of South Sudan: After the Celebrations, the New Country and Its Supporters Cannot Relax," *New York Times*, July 9, 2011.

southern autonomous region provided its military $472 million and its Ministry of Agriculture only $16.8 million in the 2010 budget.[121]

The fine-print: terms of the initial agreement

Neither the Comprehensive Peace Accord of 2005 nor the independence referendum of 2011 created any rent-sharing or pricing mechanisms more sophisticated than the original fifty-fifty split to manage oil production in South Sudan and the terms of transit through Sudan.

Upping the ante: challenges faced by stakeholders

The glaring challenge with GNOP following the referendum was determining a rational pricing mechanism for oil transit fees paid by South Sudan to export oil via Sudan-controlled GNOP and Port Sudan.[122] In December 2011, when Sudan demanded $36 a barrel for oil transit from South Sudan, South Sudan refused to pay royalties to Sudan, spurring Sudan to seize oil tankers with southern oil as payment in kind.[123] In response, South Sudan shut down all production of oil and insisted that Sudan agree to a significantly smaller transit fee. Sudan demanded $1 billion in missed fees, blockaded roads into the south, and held up humanitarian shipments. The resulting cut in 98 percent of South Sudan's budget led to inflation, a national food crisis, instability in the countryside exploited by northern-backed Arab militias, and a fall in GDP by almost 50

[121] Rebecca Hamilton, "Awaiting Independence Vote, Southern Sudan Has High Hopes," *Pulitzer Center*, November 28, 2010, http://pulitzercenter.org/articles/southern-sudanese-say-independence-vote-will-improve-life.
[122] "Sudan and South Sudan Make Progress: An Oil Pipeline Deal Is a Good Step, but the Two Countries Face Many Other Volatile Issues," *New York Times*, August 10, 2012.
[123] Jeffrey Gettleman, "SUDANS' OIL FEUD RISKS SHATTERING A FRAGILE PEACE: PROXY FIGHTS FLARE UP Vague Accord Seeks to Stave Off Slide to an All-Out Conflict," *New York Times*, February 11, 2012.

percent.[124] On the other hand, losing control of oil sources and revenues precipitated "one of the deepest crises that President Omar Hassan al-Bashir has faced in his more than 20 years in power": inflation, a shrinking economy marked by a fall in GDP of more than 10 percent, student protests, rebellions in more than three provinces, American sanctions, no money to pay the army, and no money for fuel subsidies.[125]

Following international pressure and mediation led by the Kenyans, Sudan and South Sudan arrived at a deal in August 2012, wherein South Sudan agreed to pay upwards of $20 per barrel in transit fees to Sudan.[126] Simultaneously, both sides declared once again to remove their military forces from the border and contested regions and commit to the freer flow of goods, services, and people.[127] Despite this resolution, violence would continue until summer of 2013 as both states funded rebel and insurgent proxies across their borders to fight the opposing governments. Moreover, the fixed oil transit fee caused a crisis in South Sudan in January 2016 as global oil price per barrel approached the fee that South Sudan pays to Sudan for pipeline transit. Sudan initially refused to renegotiate the terms of the transit fee, and South Sudan naturally asserted its right to not produce oil at a loss.[128] Ultimately, Sudan agreed to levy an unspecified transit fee that fluctuates according to the global spot of price of crude oil,[129] guaranteeing that South Sudan could make a profit from oil sales.

The stakeholders: evolution in perspectives

[124] Ibid.
[125] Ibid.
[126] Jeffrey Gettleman, "Two Sudans Reach Deal on Fees for Oil Pipelines," *New York Times*, August 5, 2012.
[127] Gettleman, "Sudan and South Sudan Sign Accord, but Several Issues Are Unresolved."
[128] "South Sudan Vows to Shut down Oil Fields, Pipeline over High Transportation Fees," *Sudan Tribune*, January 18, 2016, http://www.sudantribune.com/spip.php?article57726.
[129] "South Sudan Strikes New Deal with Sudan on Oil Transit Charges," *Sudan Tribune*, February 3, 2016, http://www.sudantribune.com/spip.php?article57895.

The level of rhetoric between Sudan and South Sudan has been cyclic. Following the 2011 referendum, both President Bashir of Sudan and President Kiir of South Sudan promised to pursue peace and normalization of relations. One year later, on April 24, 2012, in the midst of the South Sudan – Sudan disagreement over oil transit fees and troop movements through border regions, including the Sudanese oil field Heglig, President Bashir insisted on using a military approach to drive South Sudanese troops out of border regions. Then, again, on April 12, 2013, President Bashir ordered the border with South Sudan to be opened again, promising peace and normalization.[130] Understandably, a history of bitterness between Presidents Bashir and Kiir must exist, given that they fought one another during the Second Sudanese Civil War.[131] At the same time, no further violent rhetoric has yet emerged from either Khartoum or Juba in reference to the other state. Moreover, Sudan and South Sudan set up a joint military force in 2014 to protect the oilfields in South Sudan during the South Sudanese Civil War.[132] Perhaps both leaders recognized the interconnectedness and interdependence of the two states after the disastrous "hold up" of GNOP by South Sudan in 2011 and 2012.

The impact of the pipeline on interstate relations

The mere existence and cross-border nature of GNOP rendered either state vulnerable to the "hold up" problem, and disagreement over the transit fees – the terms of transit – led South Sudan to stop oil production for half a year, devastating the economies of both states. Not only that, but the disagreement directly led to renewed border clashes,

[130] "President Bashir Orders South Sudan Border to Be Opened," *BBC News*, April 12, 2013, http://www.bbc.com/news/world-africa-22119556.
[131] Gettleman, "Sudan and South Sudan Sign Accord, but Several Issues Are Unresolved."
[132] "Sudan and S Sudan Agree to Protect Oilfields," *Al Jazeera*, January 7, 2014, http://www.aljazeera.com/news/africa/2014/01/cloneofsudanese-president-juba-discuss-crisis-20-201416134227113126.html.

proxy action, and militarized interstate disputes between Sudan and South Sudan. Because of the short time period during which South Sudan has existed within the international system, and the extent to which southern Sudanese engaged in conflict with the Sudanese government before the referendum, it is unclear whether GNOP actually increased the level of overall tensions between the two states. In fact, it is even possible that the catastrophic results of South Sudan's self-imposed oil production shutdown on the economies and populations of both South Sudan and Sudan made a lasting impression in the eyes of the Sudanese elite, mitigating future conflict[133]. Regardless, the existence of GNOP induced conflict between the two states by making the "hold up" a possibility, as evidenced by South Sudan's decision to cut off oil supplies in 2011 and the ensuing clashes between South Sudanese and Sudanese forces.

Conclusion

The two cases demonstrate that under certain conditions, cross-border pipelines can create beneficial economic interdependence that likely reduces interstate conflict over time, and under other conditions, cross-border pipelines can create a more problematic form of economic interdependence wherein a participating state can "hold up" the pipeline to induce more favorable political behavior or renegotiate the terms of transit. Broad consensus in international relations literature from empirical analyses holds that economic interdependence tends to reduce interstate conflict. On the other hand, the economic fundamentals of cross-border pipelines and the lack of normalized arbitration processes often force pipeline operators and states in positions that render them

[133] More analysis of the South Sudan-Sudan relationship can be found in Ottaway and Ottaway, "How the Kurds Got Their Way." The possibility for a cross-border pipeline to both increase and reduce interstate conflict within a particular dyad over different periods of time is addressed in Chapter 4.

vulnerable to expropriation and the "hold up" problem, respectively, which tends to increase interstate conflict. The next chapter details the methodology and results of an empirical analysis designed to measure the net effect of cross-border pipelines on interstate conflict.

Chapter 3

Empirical Analysis of Cross-Border Pipelines: Data, Methodology, and Results

In order to systematically evaluate the net effect of cross-border pipelines on the incidence of interstate conflict, this thesis conducts an empirical dyad-year analysis using the Oneal and Russett replication data set from *Triangulating Peace*, augmented with dyad-year measures of cross-border pipeline infrastructure from a novel and comprehensive database of cross-border oil and natural gas pipelines. Initial results suggest that the number of operating oil pipelines, operating gas pipelines, and operating pipelines in general significantly increased conflict between pairs of countries between 1946 and 1992. However, further investigation reveals that a small set of high-leverage points, or outliers that heavily influenced the outcomes of the models, caused the statistically significant results. After omitting those points, empirical analysis finds no robust effect of cross-border pipelines on the incidence of interstate conflict.

Data: Using the Dyad-Year Approach

To study whether cross-border pipelines decreased or increased the incidence of interstate conflict, this thesis utilized a common approach in political science literature used to empirically study questions of a bilateral nature, such as predicting the amount of bilateral trade two particular states will share in a given year or the number of international government organizations of which two particular states will both be members in a given year. The approach relies on the availability of panel data – data that is cross-sectional, meaning it involves different countries, and also longitudinal, meaning

it involves observations from multiple years. Existing quantitative analyses of panel data in international relations involve a wide range of topics, including predicting UN voting coincidence rates, the onset of war, length of a rivalry in years, repression of human rights, and of course, the onset of political conflict and disputes between states.[1] Therefore, a quantitative analysis of the onset of interstate conflict given certain measures of interstate pipeline infrastructure does not clash with existing international relations methodologies *a priori*.

The basic cluster of study in this approach is the dyad, or a pair of countries. Examples of such dyads include the USSR and West Germany, West Germany and France, and the United States and Iraq. For any dyad of countries, it is possible to generate a set of observations corresponding to the years in which both of the countries – therefore the dyad itself – existed in the international system. For instance, the US and USSR existed as a dyad of countries from 1922 to 1991, and West Germany and the USSR existed as a dyad of countries from 1949 to 1990. Therefore, if our panel data were comprised of these two dyads, it would have 70 observations for the US-USSR dyad and 42 observations for the West Germany-USSR dyad. Therefore, the basic observation or unit of study in this approach is the dyad-year: a pair of countries in a particular year, such as the US and USSR in 1979 or West Germany and the USSR in 1983. To augment this dataset into something more interesting, one can attach additional information to each dyad-year observation: continuous variables, such as the level of bilateral trade between the two countries in the dyad in that year, or binary variables, such as whether the two countries in the dyad were formally allies in that year.

[1] Donald P. Green, Soo Yeon Kim, and David H. Yoon, "Dirty Pool," *International Organization* 55, no. 2 (June 1, 2001): 448–449, doi:10.1162/00208180151140630.

Creating dyad-year data may appear daunting when one considers the following facts: 193 recognized UN member states make up 18,528 unique dyads, panel data studies in international relations often extend for decades, if not centuries, and scholars are often interested in finding patterns among tens of different variables that are recorded for each dyad-year.[2] Fortunately, existing software, such as the Expected Utility Generation and Data Management Program (EUGene), automates the process of generating dyad-year data with any accompanying variables of interest.[3] Despite the relative ease of producing new dyad-year data with such software, this thesis builds upon the existing empirical analysis done by Oneal and Russett in 2001 for *Triangulating Peace*, rather than relying upon a newly generated dyad-year dataset. Based on an empirical analysis from 1885 to 1992, the core thesis of *Triangulating Peace* is that increasing levels of economic interdependence, joint membership in international government organizations, and democratization reduce interstate conflict.[4]

The empirical analysis of this thesis uses an augmented version of the original Oneal and Russett dyad-year dataset for several reasons. First, not only have the authors' results become the subject of much subsequent study, but their methodology has also become the subject of study among those interested in improving the quantitative approaches taken in international relations,[5] which means that the dataset itself is commonly used and the original analysis easily replicated, years after the original print.

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[2] Consider the 1950-1992 dataset Erik Gartzke uses in "The Capitalist Peace," which involves 386,556 observations or dyad-years, 17,194 unique dyads, and more than 110 auxiliary variables for each dyad-year.

[3] D. Scott Bennett and Allan C. Stam, "*Eugene* : A Conceptual Manual," *International Interactions* 26, no. 2 (January 2000): 179–204, doi:10.1080/03050620008434965.

[4] Ward, "Book Review."

[5] Peter M. Aronow, Cyrus Samii, and Valentina A. Assenova, "Cluster–Robust Variance Estimation for Dyadic Data," *Political Analysis* 23, no. 4 (October 2015): 564–77, doi:10.1093/pan/mpv018.

Second, their dyad-year dataset provides a set of widely accepted "control" variables that have both theoretically- and empirically-grounded reasons for affecting interstate conflict, against which subsequent studies can compare new variables. This places new variables, such as measures of dyadic cross-border pipeline infrastructure, in the statistical context of other variables for the dyad-year, such as bilateral trade.

Data: Including Conflict and Control Variables[6]

Oneal and Russett coded the presence or lack of conflict in each dyad-year using the well-established and commonly-used Correlates of War database of militarized interstate disputes (MIDs), which catalogues all "historical cases of conflict in which the threat, display or use of military force short of war" by one state is directed towards another.[7] Oneal and Russett note that wars themselves are too rare between states in recent history for finding interesting patterns, so conflicts occurring at the levels captured by MIDs are widely used as a close approximation to the level of general interstate conflict.[8] To illustrate the difference between a war and a MID, the US invasion of Iraq in 2003 is considered to be a war, whereas US, UK, and French enforcement of two no-fly zones in Iraq from 1991 to 2003 is considered to be a long-running MID involving Iraq on one side and the US, UK, and France on another.[9] In sum, if the Correlates of War MID database recorded a MID for a particular dyad of states in a certain year, Oneal and

[6] Additional detail into why Oneal and Russett selected these variables, as well as the authors' theoretical and empirical evaluation of their effects on interstate conflict, can be found in Chapter 3, "Democracy Reduces Conflict," pages 81-124 of *Triangulating Peace.*

[7] D. M. Jones, S. A. Bremer, and J. D. Singer, "Militarized Interstate Disputes, 1816-1992: Rationale, Coding Rules, and Empirical Patterns," *Conflict Management and Peace Science* 15, no. 2 (January 1, 1996): 163, doi:10.1177/073889429601500203.

[8] Russett and Oneal, *Triangulating Peace*, 94.

[9] MID incidences would be listed for the US and Iraq from 1991 to 2003, UK and Iraq from 1991 to 2003, and France and Iraq from 1991 to 1998 (France withdrew from the operation in 1998).

Russett coded the variable DISPUTE as a one. If the dyad did not, Oneal and Russett coded the variable DISPUTE as a zero.

The other control variables in the dataset are ALLIES, DISTANCE, POWERRATIO, JOINTIGOS, LOWERDEM, LOWERDEP, and MINORPOWERS, NONCONTIGUITY.[10] The authors coded the variable ALLIES as a one if the countries in the dyad shared a mutual defense treaty, neutrality pact, or entente in that year and zero if not. Allies rarely engage in MIDs due to shared security and strategic interests. DISTANCE is the logarithm of the shortest distance around the surface of the globe between the capitals of the two countries in the dyad that year. Naturally, the value of DISTANCE within a particular dyad almost never changes over time, as the vast majority of state capitals remained constant in the past century.[11] States that are farther away engage in fewer MIDs, particular those that are not great powers and thus do not possess power-projecting capabilities. POWER RATIO is the logarithm of the ratio of the stronger state's capability index to the weaker state's capability index, which is the fraction of the international system's total population, urban population, energy consumption, iron and steel production, military manpower, and military expenditures that belongs to the state. The greater the disparity of capabilities, the more evident the disparity becomes, and the less frequently the two states engage in MIDs. JOINTIGOS counts the number of international government organizations in which both countries in the dyad were members in the given year. LOWERDEM is the lower of the two net democracy scores of the two countries in the dyad, and LOWERDEP is the smaller of the

[10] Russett and Oneal, *Triangulating Peace*, 81–124.
[11] Of course, the number of dyads in the period 1885 to 1992, excluding the immediate post-World War II period, changes quite dramatically from a low of 104 in 1885 to a high of 865 in 1987. Note either number is a far cry from 18,528 UN member state dyads that exist today because Oneal and Russett only include "politically-relevant" dyads.

two economic dependence values of the two countries in the dyad.[12] In addition to the other controls, Oneal and Russett expected these last three variables to reduce interstate conflict, thus manifesting the "liberal peace."

The authors also included NONCONTIGUITY, coded as a one if the dyad did not share a land boundary or was separated by more than 150 miles of water, and MINORPOWERS, coded as a one if the dyad only includes minor powers. Dyads that engage in the most MIDs tend to either be contiguous – they share a land boundary or are separated by less than 150 miles of water – or contain at least one country that is a major power at the time. In fact, from 1885 to 1992, such dyads, which they term "politically relevant," constituted only 22 percent of all of the possible dyads but were responsible for 87 percent of all MIDs.[13] To illustrate why the analysis can be limited to politically relevant dyads, consider the dyad of Belize and Kazakhstan. It is unreasonable to expect a high likelihood of MID-level conflict between Belize and Kazakhstan because the two states are geographically removed, lack the military capabilities as minor powers to do one another harm, and have almost no points of legitimate dispute. Limiting the empirical analysis to politically relevant dyads should not reduce much granularity since the majority of pre-1993 cross-border pipelines did not involve transit states, and the majority of those that did involve transit originated in the USSR, a major power.

Data: Converting the Pipeline Database into Variables

An empirical analysis of the effect of cross-border pipelines on interstate conflict required historical pipeline data, particularly in dyad-year format. First, I created a

[12] Oneal and Russett defined economic dependence as trade dependence, or the bilateral trade between the two countries divided by their respective GDP values.
[13] Russett and Oneal, *Triangulating Peace*, 102.

comprehensive database of every single cross-border oil and natural gas pipeline that could be readily identified. I combed through academic sources, open source lists, and proprietary business information to identify the names of 307 cross-border oil and natural gas pipelines; I found that existing lists were neither comprehensive nor entirely accurate. For instance, many pipelines lacked project names and were identifiable based only on two city names: the point of origin of the pipeline in one country, and the endpoint of the pipeline in the other. This dramatically increased the obscurity of the pipeline and inflated the amount of time necessary to locate more information about the pipeline. Once armed with each pipeline name, I delved into books, scholarly journals, corporate websites, maps, and news media to find, at the very least, additional details about the route, capacity, length, and transit states involved in each cross-border pipeline. Not only did I aim to catalogue each cross-border pipeline, but I also sought to catalogue the history of each cross-border pipeline. As discussed in the previous chapter, pipelines are long-lived projects that can be extended, upgraded, suspended, held up, or even mothballed – all of which are details that are critical to adding temporal variance in the pipeline variables for the dyad-year panel data. A famous and simple pipeline project like Nordstream AG took only a few minutes to catalogue; an older and more complicated pipeline network, such as the former Soviet Bratstvo pipeline network carrying natural gas from Russia to Europe,[14] could take days to research. Fully sourced, the cross-border pipeline database contains 213 gas pipelines, 94 oil pipelines, and 65 transit pipelines.

[14] The Bratstvo pipelines, Soyuz pipeline, and Urengoy-Pomary-Uzhgorod pipeline are often confused for one another by scholars, media, corporate websites, and maps. Refer to Chapter 1 of Heinrich and Pleines, *Export pipelines from the CIS region: geopolitics, securitization, and political decision-making*, for a lucid history of Soviet and post-Soviet pipelines.

Second, using the chronologies of the pipelines in this database, I extended the Oneal and Russett dataset to include the following additional variables: the total number of operating gas pipelines (GAS), total number of operating oil pipelines between each dyad of countries in that particular year (OIL), and the total number of operating pipelines in general between each dyad of countries in that particular year (ALL).[15] I also included auxiliary variables for the total amount of natural gas pipeline capacity (in billion cubic meters per year), oil pipeline capacity (in million metric tons per year), gas pipeline length (in kilometers), and oil pipeline length (in kilometers). I performed the extension using a script written in the R programming language for statistical computing, which enabled me to convert each unique pipeline-period into a set of dyad-years. For example, if the United States and Mexico commissioned a cross-border oil pipeline in 1977 with an initial length of 750 kilometers and initial capacity of 15 million metric tons per year, the script would increment OIL in the US-Mexico dyad by one for each year from 1977 to 1992. The script would also add 750 to the total amount of oil pipeline length and 15 to the total amount of oil pipeline capacity within the US-Mexico dyad for each year from 1977 to 1992. If this hypothetical pipeline were upgraded to a capacity of 25 million metric tons per year in 1985, the script would instead add 15 for each year from 1977 to 1984 and 25 for each year from 1985 to 1992 to the total amount of oil pipeline capacity within the US-Mexico dyad.

I limited the empirical analysis to time period of 1946-1992 because 303 of the 307 cross-border pipelines in the database were commissioned after World War II.[16] The empirical analysis prioritized studying the variables GAS, OIL, and ALL over the other

[15] The total number of operating pipelines in general is equal to the sum of operating gas pipelines and the operating oil pipelines.
[16] The remaining four pipelines were commissioned in 1934, 1934, 1941, and 1945.

measures of capacity and length. Finding the number of operating pipelines within a dyad by identifying the actual pipelines was easier than finding reliable capacity or length data that accurately characterized each cross-border pipeline over its lifetime. For instance, while I could be certain that Tanzania and Zambia commissioned the crude oil "Tazama" pipeline in 1968 with an initial capacity of 712,000 metric tons of oil per year and length of 1702 kilometers,[17] and that a news article from 2009 reported that the governments were considering fixing the same pipeline because its capacity had fallen to 600,000 metric tons of oil per year due to maintenance issues that began at a prior unspecified time,[18] I could not faithfully determine the actual capacity of the pipeline from 1969 to 1992. Note that most cross-border pipelines do not even operate at their design capacity, which is the maximum volume of natural gas or oil that can be transported per year. I could not find reliable annual volume data for the entire lifetime of any one particular cross-border pipeline, let alone the 307 pipelines in the database. Overall, this restricted dyad-year dataset included 951 unique dyads and 28,236 unique observations or dyad-years. 1386 MIDs occurred within those dyads and during this time period for a baseline probability rate of MID incidence of 4.9 percent.

Methodology: Process of Analysis

The empirical analysis of this thesis begins with the recreation of Table A5.1 in *Triangulating Peace*, which shows the result of training a logistic regression using an AR(1) binomial generalized estimating equation (GEE) to predict the incidence of MIDs within a dyad-year using the control variables (Table 3.1). The logistic regression models

[17] I. L. Griffiths, "THE TAZAMA OIL PIPELINE," *Geography* 54, no. 2 (1969): 214–17.
[18] Nicholas Bariyo, "Zambian Govt Seeks To Recapitalize Tazama Oil Pipeline," *Dow Jones Commodities News*, September 29, 2009, http://downstreamtoday.com/news/article.aspx?a_id=18422&AspxAutoDetectCookieSupport=1.

the probability of a dyad engaging in a MID in the given year based on the values of controls, while adjusting for temporal correlation using the AR(1) specification.

Table 3.1: Logistic Regression of Democracy, Trade, IGO Membership, and Other Influences on MID Involvement[19]

VARIABLES	(1) 1886 - 1992	(2) 1946 - 1992
Alliances	-0.539***	-0.755***
	(0.159)	(0.193)
Power ratio	-0.318***	-0.346***
	(0.0432)	(0.0599)
Lower democracy	-0.0608***	-0.0467***
	(0.00944)	(0.0121)
Lower dependence	-52.92***	-43.46[20]
	(13.41)	(22.63)
International organizations	-0.0135**	-0.0224***
	(0.00426)	(0.00575)
Noncontiguity	-0.989***	-1.166***
	(0.168)	(0.249)
Log distance	-0.376***	-0.438***
	(0.0647)	(0.0841)
Only minor powers	-0.647***	-0.840**
	(0.178)	(0.273)
Constant	-0.128	0.657
	(0.536)	(0.695)
Observations	39,988	28,229
Number of dyads	1,178	944

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

The estimated coefficients for JOINTIGOS, LOWERDEM, and LOWERDEP are negative and statistically significant, meaning that they are associated with a decrease in the incidence in MIDs. The authors used these results as proof of their thesis – that

[19] Because the empirical analysis with pipelines is limited to the period of 1946-1992, I included the models developed using both the full dataset (1) and the limited dataset (2). The limited dataset includes 28,229 observations, with 944 unique dyads.
[20] The estimated coefficient for LOWER DEPENDENCE in the second, sparser model has p = 0.055.

democratization, economic interdependence, and international organization membership decrease conflict.

The empirical analysis continues by using the same AR(1) GEE logistic regression model to predict the incidence of MIDs within dyad-years, this time including the relevant pipeline variables of OIL, GAS, and ALL (Table 3.2).

Table 3.2: Logistic Regression of the Number of Operating Pipelines and Other Influences on MID Involvement, 1946-1992

VARIABLES	(1) Oil & Gas	(2) Oil	(3) Gas	(4) Total
Alliances	-0.778***	-0.780***	-0.762***	-0.771***
	(0.196)	(0.195)	(0.193)	(0.194)
Power ratio	-0.350***	-0.350***	-0.348***	-0.349***
	(0.0602)	(0.0602)	(0.0600)	(0.0602)
Lower democracy	-0.0474***	-0.0474***	-0.0469***	-0.0472***
	(0.0124)	(0.0124)	(0.0123)	(0.0124)
Lower dependence	-52.40*	-52.05*	-47.31	-50.69*
	(25.87)	(25.27)	(24.37)	(25.78)
International organizations	-0.0225***	-0.0225***	-0.0225***	-0.0225***
	(0.00586)	(0.00585)	(0.00581)	(0.00585)
Noncontiguity	-1.160***	-1.161***	-1.158***	-1.158***
	(0.251)	(0.251)	(0.250)	(0.251)
Log distance	-0.433***	-0.433***	-0.435***	-0.434***
	(0.0843)	(0.0843)	(0.0844)	(0.0844)
Only minor powers	-0.828**	-0.830**	-0.827**	-0.826**
	(0.274)	(0.274)	(0.274)	(0.274)
Oil pipelines	0.260	0.321**		
	(0.185)	(0.113)		
Gas pipelines	0.0557		0.166***	
	(0.0972)		(0.0440)	
All pipelines				0.130***
				(0.0311)
Constant	0.648	0.644	0.655	0.653
	(0.698)	(0.697)	(0.697)	(0.697)
Observations	28,229	28,229	28,229	28,229
Number of dyads	944	944	944	944
P-value of joint significance	3.30e-05			

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

To comprehensively test the effect of OIL, GAS, and ALL on the incidence of MIDs, I tested logistic regression models that included the controls and OIL and GAS, the controls and OIL, the controls and GAS, and the controls and ALL – columns (1), (2), (3), and (4) in Table 3.2. Note that the estimated coefficients for OIL, GAS, and ALL, when individually included in the model, are each statistically significant and positive. In fact, OIL, GAS, and ALL each exhibit greater influence on the incidence of MIDs than LOWERDEM and JOINTIGOS, albeit in the opposite direction, with OIL exhibiting almost as much influence as POWERRATIO. When included in the model together (1), OIL and GAS have estimated coefficients that are not individually significant. However, a joint test of significance results in a p-value of approximately zero, indicating that OIL and GAS are jointly significant. This occurs because from 1946 to 1992, OIL and GAS have a 74.3 percent correlation across all dyad-year observations. This correlation appears sensible, as dyads that can afford pipeline infrastructure for one natural resource can likely afford pipeline infrastructure for the other natural resource, and since many of the world's energy producers at the time, including the US, Canada, the USSR, and northern European states operating in the North Sea, possessed reserves in both natural resources. In any case, the positively significant estimated coefficients for OIL, GAS, and ALL suggest that pipelines increased interstate conflict from 1946 to1992.

In recent years, methodological advances in analyzing panel data for international relations studies have led to the critique of treating dyad-years as "pooled" data and to the emergence of the "fixed effects" approach.[21] Informally, the pooled approach treats all dyad-year observations similarly, ignoring the fact that particular dyads may be expected

[21] Green, Kim, and Yoon, "Dirty Pool."

to have different average values for the dependent variable. For instance, the pooled approach taken by Oneal and Russett in 2001 and replicated in the empirical analysis in Tables 3.1 and 3.2 assumes that the dyad of India and Pakistan could have the same average number of MIDs as the dyad of France and Germany if all of the independent variable values were zero. This occurs because the pooled regression approach estimates a single intercept, which happens to be the average value of the dependent variable when all independent variables are equal to zero. Green puts the core assumption of pooled approaches best: "It doesn't matter which dyad one picks; the intercepts are all the same."[22] The fixed effects model corrects for this difference by introducing a regression coefficient – in other words, a new independent variable – for each particular dyad and each particular year. Informally, regressing on to fixed effects of dyads and years removes the effect that a dyad has on all of the dyad-years in its cluster and removes the effect that a year has across all the observations in that particular year.

A priori, one might expect different dyads in this dataset to have different intercepts because of different likelihoods of engaging in MIDs. For instance, during the period of 1946 to 1992, one can almost certainly expect India and Pakistan to have a higher expected number of MIDs than France and Germany. However, the existence of different intercepts across dyads is not enough to warrant the fixed effects model; the omitted intercepts must introduce bias in the pooled approach.[23] The empirical analysis tests fixed effects models that use the same sets of control and pipeline variables as before (Table 3.3). These models feature drastically different regression results for the control coefficients compared to the logistic regression model. In the model without

[22] Ibid., 443.
[23] Ibid., 452.

pipeline variables (1), only POWERRATIO, LOWERDEP, and JOINTIGOS remain significant. The latter two variables also have positive, instead of negative, coefficients. Moreover, the fixed effects are necessary, as the Hausman test, which checks whether the estimated fixed effects in models (1) and (2) could have simply been random, is significant. Note that the control variables DISTANCE and MINORPOWERS are omitted because the values of those variables do not change within any dyads for the time period from 1946 to 1992, and therefore do not impact the regression.[24] At the same time, all pipeline variables remain significant, as OIL, GAS, and ALL are individually significant in (3), (4), and (5), and OIL and GAS together in (2) are jointly significant according to the p-value of 0.0005. In other words, the pipeline coefficients remain robustly positive, even under a fixed effects approach.

Table 3.3: Year and Dyad Fixed Effects Regression of the Number of Operating Pipelines and Other Influences on MID Involvement, 1946-1992

VARIABLES	(1) FE	(2) Oil & Gas FE	(3) Oil FE	(4) Gas FE	(5) Total FE
Alliances	-0.0111	-0.0112	-0.0110	-0.0112	-0.0111
	(0.00897)	(0.00897)	(0.00897)	(0.00897)	(0.00897)
Power ratio	-0.0157***	-0.0161***	-0.0159***	-0.0161***	-0.0162***
	(0.00391)	(0.00391)	(0.00392)	(0.00391)	(0.00391)
Lower democracy	0.000554	0.000558	0.000561	0.000558	0.000561
	(0.000393)	(0.000393)	(0.000393)	(0.000393)	(0.000393)
Lower dependence	0.730*	0.599	0.591	0.605	0.557
	(0.348)	(0.353)	(0.353)	(0.349)	(0.351)
International	-	-	-	-	-

[24] Incorporating fixed effects for the dyads involves subtracting out their effects from the data instead of trying to estimate a coefficient for every one of the 951 dyads in the Oneal and Russett dataset. The average values of both the dependent variables and the independent variables within each cluster or dyad are subtracted from the variable values within each observation or dyad-year. Because DISTANCE and MINORPOWERS do not change over time within dyads, their average dyadic values are the same as the individual values of each dyad-year. Thus, the subtraction nulls all the two variables for all dyad-years. The way fixed effects models are estimated is discussed in much greater detail by Green, Kim, and Yoon, "Dirty Pool."

organizations	0.000456**	0.000450*	0.000454**	0.000450*	0.000450*
	(0.000176)	(0.000175)	(0.000176)	(0.000175)	(0.000175)
Noncontiguity	-0.0110	-0.0105	-0.0106	-0.0105	-0.0104
	(0.00996)	(0.00996)	(0.00996)	(0.00995)	(0.00995)
Oil pipelines		0.00109	0.0206*		
		(0.0110)	(0.00909)		
Gas pipelines		0.0166**		0.0169***	
		(0.00528)		(0.00436)	
All pipelines					0.0122***
					(0.00328)
Constant	0.0601	0.0615	0.0580	0.0616	0.0599
	(0.0489)	(0.0489)	(0.0489)	(0.0489)	(0.0489)
Observations	28,236	28,236	28,236	28,236	28,236
R-squared	0.006	0.007	0.007	0.007	0.007
Number of dyads	951	951	951	951	951
P-value of Hausman test	0	0			
P-value of joint significance		0.000550			

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Recent use of fixed effects models has led to increased scrutiny of their assumptions. Most importantly, these models assume that the observations within each dyad cluster are uncorrelated, meaning the year-by-year observations of a particular pair of countries, such as West Germany and the USSR in 1965, 1966, 1967, and so on do not share any correlation among either the independent variables or the dependent variable. Of course, with international relations dyad-year data, most year-by-year values are correlated: intergovernmental organization membership is unlikely to change drastically in any one year, high amounts of bilateral trade between two countries in one year likely precede high amounts of bilateral trade between the same two countries in the next year, and certainly the number of operating gas and oil pipelines within a dyad remains relatively rigid over decades due to the monopolistic characteristics and long lifespans of pipelines. The main consequence of intra-dyad correlation is that each successive

observation within the cluster, or each dyad-year, does not provide the fixed effects model with as much new information as the model is assumed to be receiving because the observation is so similar to its predecessors. To account for this issue, scholars suggest "clustering the standard errors," or inflating the standard errors of the estimated regression coefficients by a factor that is proportional to the number of clusters (i.e. dyads) and average number of observations in each cluster (i.e. dyad-years in a dyad).[25]

Therefore, the empirical analysis follows by testing the fixed effects approach with clustering of standard errors (Table 3.4). With the exception of OIL as a pipeline variable in its own regression with only the other controls (3), OIL and GAS remain jointly positively significant (2), and GAS and ALL remain positively significant in separate models (4, 5). However, under standard error clustering, none of the controls remain statistically significant. Note again that the control variables DISTANCE and MINORPOWERS are omitted because the values of those variables do not change for the time period from 1946 to 1992 and therefore do not impact the regression.

Table 3.4: Year and Dyad Fixed Effects Regression of the Number of Operating Pipelines and Other Influences on MID Involvement With SE Clustering, 1946-1992

VARIABLES	(1) FE	(2) Oil & Gas FE	(3) Oil FE	(4) Gas FE	(5) Total FE
Alliances	-0.0111	-0.0112	-0.0110	-0.0112	-0.0111
	(0.0134)	(0.0134)	(0.0134)	(0.0134)	(0.0134)
Power ratio	-0.0157	-0.0161	-0.0159	-0.0161	-0.0162
	(0.00863)	(0.00865)	(0.00866)	(0.00864)	(0.00865)
Lower democracy	0.000554	0.000558	0.000561	0.000558	0.000561
	(0.000478)	(0.000478)	(0.000479)	(0.000478)	(0.000478)
Lower dependence	0.730	0.599	0.591	0.605	0.557
	(0.372)	(0.357)	(0.366)	(0.348)	(0.351)
International organizations	-0.000456	-0.000450	-0.000454	-0.000450	-0.000450

[25] A. Colin Cameron and Douglas L. Miller, "A Practitioner's Guide to Cluster-Robust Inference," *Journal of Human Resources* 50, no. 2 (2015): 16, doi:10.3368/jhr.50.2.317.

	(0.000294)	(0.000294)	(0.000294)	(0.000294)	(0.000294)
Noncontiguity	-0.0110	-0.0105	-0.0106	-0.0105	-0.0104
	(0.0180)	(0.0180)	(0.0180)	(0.0180)	(0.0180)
Oil pipelines		0.00109	0.0206		
		(0.0188)	(0.0186)		
Gas pipelines		0.0166*		0.0169***	
		(0.00647)		(0.00283)	
All pipelines					0.0122***
					(0.00236)
Constant	0.0601	0.0615	0.0580	0.0616	0.0599
	(0.0388)	(0.0386)	(0.0388)	(0.0389)	(0.0389)
Observations	28,236	28,236	28,236	28,236	28,236
R-squared	0.006	0.007	0.007	0.007	0.007
Number of dyads	951	951	951	951	951
P-value of joint significance		7.04e-09			

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Therefore, it appears as if during the Cold War, both oil and gas pipelines tended to cause conflict between participating states, which suggests that the "hold up" problem and the costly aspects of economic interdependence generated a net conflict-inducing affect on participating states.

Methodology: Checking the Robustness of Results

To evaluate the robustness of the results and grasp at what mechanisms generated them, I estimated additional fixed effects regressions using Gartzke's dyad-year dataset of all dyads and years from 1950-1992.[26] Not enough dyad-years existed in any particular region or continent of the world in the Oneal and Russett dataset because the dataset is restricted to only politically relevant dyads, or 22 percent of the overall number of dyads. Unlike Oneal and Russett, Gartzke held on to non-politically relevant dyads, enabling me to conduct additional fixed effects regressions at the regional level. A fixed effects

[26] Erik Gartzke, "The Capitalist Peace," *American Journal of Political Science* 51, no. 1 (January 2007): 166–91, doi:10.1111/j.1540-5907.2007.00244.x.

regression of OIL, GAS, and OIL and GAS jointly on the incidence of a MID in the dyad-year that is restricted to only North American dyads finds that both OIL and GAS were positively significant in increasing interstate conflict (Table 3.5). Note that due to correlation between oil and natural gas pipelines, the estimated coefficient of GAS in the joint model (1) was negative and insignificant, despite a joint test of significance with a p-value of close to zero. The individual fixed effects regressions in (2) and (3) demonstrate that both OIL and GAS have significantly positive coefficients. The estimated coefficients remain positively significant even under standard error clustering used to account for intra-dyad correlation,[27] suggesting a degree of robustness of the regional North American results.

Table 3.5: Year and Dyad Fixed Effects Regression of the Number of Operating Pipelines in North America on MID Involvement (Gartzke Data), 1950-1992

	(1)	(2)	(3)
VARIABLES	Oil & Gas	Oil	Gas
Oil pipelines	0.0630***	0.0435***	
	(0.0167)	(0.00843)	
Gas pipelines	-0.00765		0.0107***
	(0.00564)		(0.00285)
Constant	-0.0152	-0.0150	-0.0151
	(0.0137)	(0.0137)	(0.0137)
Observations	6,061	6,061	6,061
R-squared	0.030	0.030	0.028
Number of dyads	253	253	253
P-value of joint significance	7.10e-07		

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

[27] It actually appears as if the standard errors of the OIL and GAS coefficients in all three models *decreased* after clustering the standard errors, which suggests negative correlation within the cluster. The rarity of MIDs within North American dyads during the Cold War possibly results in serial negative correlation in the incidence of MIDs.

Table 3.6: Year and Dyad Fixed Effects Regression of the Number of Operating Pipelines in North America on MID Involvement With SE Clustering (Gartzke Data), 1950-1992

VARIABLES	(1) Oil & Gas	(2) Oil	(3) Gas
Oil pipelines	0.0630***	0.0435***	
	(0.00807)	(0.00181)	
Gas pipelines	-0.00765*		0.0107***
	(0.00313)		(0.00179)
Constant	-0.0152	-0.0150	-0.0151
	(0.01000)	(0.00992)	(0.00984)
Observations	6,061	6,061	6,061
R-squared	0.030	0.030	0.028
Number of dyads	253	253	253
P-value of joint significance	0		

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

At the same time, the result appears counterintuitive due to the lack of potential for serious conflict within North American dyads in the latter half of the twentieth century. A closer look at the exact dyad-years in which MIDs occurred and high numbers of oil and natural gas pipelines were operating within the dyad reveal the following five dyad-years involving MIDs between the US and Canada:

Table 3.7: US-Canada MIDs During the Cold War

Year	Gas pipelines	Oil pipelines
1974	6	7
1975	6	8
1979	12	8
1989	15	8
1991	16	8

Statistically, these dyad-year observations immediately appear to be high-leverage points, in that the US and Canada had MIDs during years in which they had high and increasing numbers of cross-border oil and natural gas pipelines operating within the dyad. The US and Canada have the highest maximum number of gas pipelines operating within a dyad at any point in time – fifteen. The US and Mexico have the second highest maximum number of gas pipelines operating within other dyads at any point in time – three. Out of 951 dyads, 922 had zero gas pipelines, 22 had a maximum of one gas pipeline operating within the dyad at all points in time, and five had a maximum of two gas pipelines operating within the dyad at all points in time. Oil is also skewed, but slightly less so: the US and Canada have the highest maximum number of oil pipelines operating within a dyad at any point in time – eight. Out of 951 dyads, 920 had zero oil pipelines, 22 had a maximum of one oil pipeline, six had a maximum of two oil pipelines, and two had a maximum of three oil pipelines operating within the dyad at all points in time. In sum, the five dyad-years in which the US and Canada had MIDs are not entirely outliers in MID incidence, but so far away from the rest of the domain in terms of operating oil and natural gas pipelines that they heavily influence the fixed effects regression models towards estimating positive coefficients for OIL and GAS.

Not only are these dyad-years high leverage points, but they also involve low-impact MIDs with few sources.[28] The 1974 MID occurred when US Customs Agents arrested a US draft evader in Canadian territory. The 1975 MID occurred due to a seizure incident between the US and Canada, but no further description of the events exist in canonical world news and events summaries such as Keesing's Contemporary Archives.

[28] Benjamin Fordham, "Militarized Interstate Disputes Not Involving a U.S. Use of Force," n.d.

The 1979 MID occurred when Canadian authorities seized US fishing boats, the 1989 MID involved a collision between a Canadian destroyer and an American ship that had been fishing in Canadian waters, and the 1991 MID occurred when the US Coast Guard seized a Canadian fishing ship in Canadian-claimed waters. Due to extensive economic trade, defense cooperation, shared values, history, and migration, scholars argue that the possibility for significant confrontation between the US and Canada ended prior to the World Wars,[29] and the US State Department notes that the US-Canada bilateral relationship is "perhaps the closest and most extensive in the world."[30]

Because of the near impossibility of minor US-Canada MIDs creating genuine bilateral conflict, and because the dyad-year observations in questions are likely high-leverage points, I omitted the observations from both the primary Oneal and Russett dataset and the secondary Gartzke dataset. First, omitting the points from the Gartzke dataset and redoing the fixed effects approach results in no significant effect of any pipeline variable on MID involvement within North American dyads, regardless of whether clustering standard errors was avoided (Table 3.8) or used (Table 3.9). The drastic change in significance lends credence to the claim that the five dyad-years in which the US and Canada engaged in MIDs are high-leverage points.

[29] Kenneth M. Curtis and John E. Carroll, *Canadian-American Relations: The Promise and the Challenge* (Lexington, Mass: Lexington Books, 1983), 12.
[30] Bureau of Public Affairs Department Of State. The Office of Website Management, "Canada 06/02," *U.S. Department of State*, January 1, 2004, http://www.state.gov/outofdate/bgn/canada/26535.htm.

Table 3.8: Year and Dyad Fixed Effects Regression of the Number of Operating Pipelines in North America on MID Involvement (Gartzke Data, Leverage Points Removed), 1950-1992

VARIABLES	(1) Oil & Gas	(2) Oil	(3) Gas
Oil pipelines	0.00386	-0.00365	
	(0.0162)	(0.00819)	
Gas pipelines	-0.00293		-0.00181
	(0.00547)		(0.00276)
Constant	-0.0150	-0.0149	-0.0150
	(0.0133)	(0.0133)	(0.0133)
Observations	6,061	6,061	6,061
R-squared	0.027	0.027	0.027
Number of dyads	253	253	253
P-value of joint significance	0.784		

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 3.9: Year and Dyad Fixed Effects Regression of the Number of Operating Pipelines in North America on MID Involvement With SE Clustering (Gartzke Data, Leverage Points Removed), 1950-1992

VARIABLES	(1) Oil & Gas	(2) Oil	(3) Gas
Oil pipelines	0.00386	-0.00365*	
	(0.0106)	(0.00181)	
Gas pipelines	-0.00293		-0.00181
	(0.00409)		(0.00122)
Constant	-0.0150	-0.0149	-0.0150
	(0.00984)	(0.00983)	(0.00984)
Observations	6,061	6,061	6,061
R-squared	0.027	0.027	0.027
Number of dyads	253	253	253
P-value of joint significance	0.105		

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Second, omitting the points from the primary Oneal and Russett dataset and then retraining the logistic regression model that predicts MID involvement within the dyad-year based on the values of the control and pipeline variables (Table 3.10), re-

implementing the fixed effects regression that more adequately controls for heterogeneity across dyads and across years (Table 3.11), and adjusting the standard errors of the coefficients estimated by the fixed effects regression for high levels of intra-dyad correlation (Table 3.12) each results in no significant or robust effect of cross-border pipelines on the incidence of MIDs from 1946 to 1992.

Table 3.10: Logistic Regression of the Number of Operating Pipelines and Other Influences on MID Involvement (Leverage Points Removed), 1946-1992

VARIABLES	(1) Oil & Gas	(2) Oil	(3) Gas	(4) Total
Alliances	-0.778***	-0.776***	-0.776***	-0.774***
	(0.198)	(0.197)	(0.197)	(0.196)
Power ratio	-0.353***	-0.352***	-0.353***	-0.352***
	(0.0608)	(0.0606)	(0.0607)	(0.0606)
Lower democracy	-0.0470***	-0.0470***	-0.0470***	-0.0469***
	(0.0126)	(0.0126)	(0.0125)	(0.0125)
Lower dependence	-63.02*	-60.49*	-61.94*	-59.83*
	(28.68)	(28.91)	(28.13)	(28.20)
International organizations	-0.0222***	-0.0222***	-0.0221***	-0.0222***
	(0.00612)	(0.00605)	(0.00610)	(0.00606)
Noncontiguity	-1.177***	-1.170***	-1.175***	-1.170***
	(0.252)	(0.252)	(0.252)	(0.252)
Log distance	-0.439***	-0.437***	-0.439***	-0.438***
	(0.0843)	(0.0844)	(0.0842)	(0.0844)
Only minor powers	-0.840**	-0.834**	-0.839**	-0.834**
	(0.275)	(0.276)	(0.275)	(0.275)
Oil pipelines	0.0313	0.0198		
	(0.250)	(0.220)		
Gas pipelines	-0.0948		-0.0875	
	(0.235)		(0.225)	
All pipelines				-0.0206
				(0.123)
Constant	0.697	0.689	0.697	0.692
	(0.700)	(0.699)	(0.699)	(0.699)
Observations	28,229	28,229	28,229	28,229
Number of dyads	944	944	944	944

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 3.11: Year and Dyad Fixed Effects Regression of the Number of Operating Pipelines and Other Influences on MID Involvement (Leverage Points Removed), 1946-1992

VARIABLES	(1) FE	(2) Oil & Gas FE	(3) Oil FE	(4) Gas FE	(5) Total FE
Alliances	-0.0110	-0.0110	-0.0110	-0.0110	-0.0110
	(0.00895)	(0.00895)	(0.00895)	(0.00895)	(0.00895)
Power ratio	-	-	-	-	-
	0.0158***	0.0158***	0.0158***	0.0159***	0.0159***
	(0.00390)	(0.00391)	(0.00390)	(0.00391)	(0.00391)
Lower democracy	0.000565	0.000564	0.000565	0.000566	0.000567
	(0.000392)	(0.000392)	(0.000392)	(0.000392)	(0.000392)
Lower dependence	0.609	0.620	0.616	0.575	0.574
	(0.347)	(0.352)	(0.352)	(0.348)	(0.350)
International organizations	-	-	-	-	-
	0.000448*	0.000447*	0.000448*	0.000447*	0.000447*
	(0.000175)	(0.000175)	(0.000175)	(0.000175)	(0.000175)
Noncontiguity	-0.0107	-0.0107	-0.0107	-0.0106	-0.0106
	(0.00993)	(0.00993)	(0.00993)	(0.00993)	(0.00993)
Oil pipelines		-0.00947	-0.00104		
		(0.0110)	(0.00906)		
Gas pipelines		0.00718		0.00462	
		(0.00527)		(0.00435)	
All pipelines					0.00247
					(0.00327)
Constant	0.0603	0.0619	0.0604	0.0607	0.0602
	(0.0488)	(0.0488)	(0.0488)	(0.0488)	(0.0488)
Observations	28,236	28,236	28,236	28,236	28,236
R-squared	0.006	0.007	0.006	0.007	0.007
Number of dyads	951	951	951	951	951

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 3.12: Year and Dyad Fixed Effects Regression of the Number of Operating Pipelines and Other Influences on MID Involvement With SE Clustering (Leverage Points Removed), 1946-1992

VARIABLES	(1) FE	(2) Oil & Gas FE	(3) Oil FE	(4) Gas FE	(5) Total FE
Alliances	-0.0110	-0.0110	-0.0110	-0.0110	-0.0110
	(0.0134)	(0.0134)	(0.0134)	(0.0134)	(0.0134)
Power ratio	-0.0158	-0.0158	-0.0158	-0.0159	-0.0159
	(0.00863)	(0.00865)	(0.00865)	(0.00864)	(0.00865)
Lower democracy	0.000565	0.000564	0.000565	0.000566	0.000567
	(0.000478)	(0.000478)	(0.000478)	(0.000478)	(0.000478)
Lower dependence	0.609	0.620	0.616	0.575	0.574
	(0.346)	(0.355)	(0.357)	(0.344)	(0.346)
International organizations	-0.000448	-0.000447	-0.000448	-0.000447	-0.000447
	(0.000294)	(0.000294)	(0.000294)	(0.000294)	(0.000294)
Noncontiguity	-0.0107	-0.0107	-0.0107	-0.0106	-0.0106
	(0.0180)	(0.0180)	(0.0180)	(0.0180)	(0.0180)
Oil pipelines		-0.00947	-0.00104		
		(0.0171)	(0.0117)		
Gas pipelines		0.00718		0.00462	
		(0.00642)		(0.00396)	
All pipelines					0.00247
					(0.00261)
Constant	0.0603	0.0619	0.0604	0.0607	0.0602
	(0.0388)	(0.0385)	(0.0386)	(0.0389)	(0.0388)
Observations	28,236	28,236	28,236	28,236	28,236
R-squared	0.006	0.007	0.006	0.007	0.007
Number of dyads	951	951	951	951	951

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Though the empirical analysis did not find any clear net effect of cross-border pipelines on the incidence of interstate conflict, future studies may be able to uncover actual trends using different and more granular data. The concluding chapter not only reviews the findings of this thesis, but also suggests further studies into cross-border infrastructure such as pipelines and their effect on interstate conflict. The next chapter also draws from the literature review in Chapter 2 and the discussion about the

"multilateral challenge" of cross-border pipelines in Chapter 1 to draw hypotheses about why the empirical analysis found a zero net effect of pipelines on interstate conflict, despite the two broad opposing trends of cooperation stemming from economic interdependence and conflict arising out of expropriation and the "hold up" problem.

Chapter 4

Flowing Forward: the Future of the Cross-Border Pipeline

The results found by the empirical analysis in this thesis do not indicate any robust effect of cross-border pipelines on the incidence of militarized interstate disputes among the participating states. Despite both statistical evidence from examples of cross-border pipelines and evidence from a case study that shows cross-border pipelines generate forms of interdependence among the participating states, and some quantitative consensus in international relations literature indicating that growing economic interdependence tends to reduce the incidence of interstate conflict, the pipeline variables used in this thesis – the number of operating oil and natural gas pipelines within the dyad – did not significantly reduce the incidence of dyadic MIDs. On the other hand, despite theoretical and case study evidence that shows cross-border pipelines expose participating states to the "hold up" problem in which one state threatens to or actually does halt pipeline flow in order to renegotiate the terms of transit or induce more favorable political behavior, which would likely increase the incidence of interstate conflict, the same pipeline variables did not significantly increase the incidence of MIDs.

Two theoretical reasons may explain the non-significant results of the empirical analysis. First, because cross-border pipelines create both economic interdependence and "hold up" vulnerabilities, the conflict-reducing effect of economic interdependence is washed out by the conflict-inducing effect of the "hold up" vulnerabilities. In effect, cross-border pipelines enhance both the "commercial peace" and conflict, but at different points in time. Second, the economic fundamentals of cross-border pipelines – high

upfront fixed costs, low variable costs, and long operating lifetimes to recoup those upfront costs – deter investors from funding projects with large political risk. In other words, dyads cannot find the external funding or technology to construct and operate cross-border pipelines unless investors and MNEs expect them to have low future rates of interstate conflict, resulting in selection bias in the data and perhaps an underestimation by the empirical analysis of the conflict-enhancing effect of cross-border pipelines.

Explanation One: Washed-Out Effects

The first explanation posits that cross-border pipelines increase and decrease the incidence of interstate conflict by creating both economic interdependence and "hold up" vulnerabilities at different points in time within the dyad. If particular dyads are more prone to "hold up" one another or more likely to mutually benefit from economic interdependence than others, the fixed effects linear regression approach, by estimating a unique, invariable intercept for each dyad, would have controlled for the difference and isolated the true effect of any cross-border pipelines on the rate of interstate conflict.[1] On the other hand, the fixed effects approach does not effectively model the dynamic context of any one particular dyad because the estimated dyadic intercept does not change over time. Put simply, if the relationship between a pair of countries with operating cross-border pipelines changes over time due to factors exogenous to the pipelines themselves, and the evolving dyadic relationship shapes the way either participating state values the operating pipelines, then it is possible for the pipeline to decrease and increase conflict within the dyad, albeit at different points in time. To illustrate, consider a hypothetical example where a pipeline transports crude oil from state A to state B from 1950 to 1980,

[1] Green, Kim, and Yoon, "Dirty Pool."

and though the pipeline increased economic interdependence and reduced interstate conflict between A and B from 1950 to 1970, an exogenous shock to the relationship in 1970, such as the rise of an anti-state B regime in state A, increased interstate conflict through "hold ups" or disputes over the terms of transit from 1970 to 1980. Here, the fixed effects model would calculate a single intercept representing the baseline rate of MIDs between A and B without meaningfully distinguishing between the pre- and post-1970 periods, likely resulting in a non-significant effect.

The exogenous shock of regime change in one state within a particular dyad may result in a regime that may not have been directly involved in the negotiations leading to the development of the cross-border pipeline. Despite the continuing objective material value of the cross-border pipeline, the geopolitical and economic context peculiar to the new regime may lead it to value the pipeline differently than the previous regime. After all, if a regime helped carry a pipeline project from planning to construction to successful operation, it is clear that the regime highly valued the project, given the economic challenges of pipelines.[2] Sunk cost fallacy would have increased the regime's commitment to the pipeline project.[3] However, regime change may result in a regime that has exogenous points of dispute with the other participating states, which would render the new regime more inclined to view the pipeline as a tool to induce more favorable economic terms or political behavior from the other state through a "hold up."

For example, despite Syrian and Iraqi interest in union following the initial Baathist revolutions, subsequent coups and party purges in the late 1960s "brought to

[2] Hayes and Victor, "Factors That Explain Investment in Cross-Border Natural Gas Transport Infrastructures: A Research Protocol for Historical Case Studies."
[3] Hal R. Arkes and Peter Ayton, "The Sunk Cost and Concorde Effects: Are Humans Less Rational than Lower Animals?," *Psychological Bulletin* 125, no. 5 (1999): 591–600, doi:10.1037/0033-2909.125.5.591.

power in both countries Baathist regimes concerned more with maintaining their own ideological purity and subverting the other than with union."[4] The dispute between the two branches of the original Baathist party not only split the Arab world, but also led to new disagreement over issues within the dyad. Not only did Iraq "hold up" its oil pipeline with Syria after Syria demanded higher transit fees, Syria began to provide support to Kurds that fought the Iraqi state and withheld water from the Euphrates Dam from Iraq, causing widespread crop failure. Syria and Iraq also supported rival Palestinian fedayeen proxies in the Lebanese Civil War. These disagreements were largely a product of the competition between Syrian president Hafez al-Assad and Iraqi president Saddam Hussein to control the overall Baathist movement in the 1970s and garner greater influence and respect in the Arab world.[5] Therefore, regime change involving the rise to power of those two presidents in their respective states fundamentally changed the relationship of the two states, as well as how they perceived dyadic connections such as the Euphrates Dam and the Kirkuk-Baniyas pipeline.

Besides regime change that may alter the political relationship of the two states, political or economic shocks to either country in the dyad that are exogenous to the dyadic relationship may alter how that country perceives existing cross-border pipeline arrangements. For example, movements in the energy market can alter the way countries in a dyad perceive the value of their pipeline relationship. Recall that cross-border pipelines possess many characteristics of a natural monopoly, including economies of

[4] Edward C. Keefer and Monica L. Belmonte, eds., *Iran; Iraq, 1973-1976*, Foreign Relations of the United States 1969/76,27 (Washington, DC: US Gov. Print. Off, 2012), 894.
[5] Ibid.

scale and high barriers to market entry due to high fixed costs.[6] However, a factor such as an oil or natural gas discovery could change the character of the energy market and thus the way a dyad perceives a cross-border pipeline.

For instance, in the case of the Urengoy-Pomary-Uzhgorod pipeline, several shocks in the energy market pushed West Germany to negotiate an unprecedented natural gas deal with the USSR in the early 1980s. The 1973 OPEC oil embargo convinced West Germany that it could no longer rely on oil imports as a future source of energy.[7] As a result, West Germany sought to replace a significant portion of its energy portfolio with natural gas, which would have necessitated new cross-border pipelines or LNG terminals.[8] However, the natural gas deals West Germany made with Algeria and Iran to shift from oil to natural gas fell through by 1980, and the Netherlands, West Germany's largest supplier, decided not to renew their contract due to concerns about falling Dutch natural gas production.[9] With few other options, West Germany turned to the existing Bratstvo pipeline as an avenue through which it could secure its natural gas supply in the future. Doing so required extensive collaboration with the USSR to build the Urengoy-Pomary-Uzhgorod pipeline to transport newly-discovered Siberian gas from the Urengoy gas field into Ukraine, which the Bratstvo pipeline would then transport to West Germany, as well as a long-term contract that obligated the USSR to sell natural gas to West Germany.[10] Therefore, shocks exogenous to the Bratstvo pipeline - the 1973 OPEC

[6] Refer to the section of Chapter 2, "Peace, Pipe, and Dreams: An Anatomy of the Cross-Border Pipeline," entitled "Economic Fundamentals of Pipelines."
[7] Stern, "Gas Pipeline Co-Operation between Political Adversaries: Examples from Europe," 1.
[8] Hardt and Gold, "The Soviet Gas Pipeline in Perspective," 28.
[9] Tagliabue, "West Germans Planning Soviet Pipeline Talks."
[10] Hardt and Gold, "The Soviet Gas Pipeline in Perspective."

crisis and the cancellation of several natural gas deals - led West Germany to see Bratstvo as an opportunity to secure a large supply of natural gas for the next few decades.

If this explanation of washed-out effects holds, the same cross-border pipelines can affect a particular dyad in different ways depending on the economic and political context. This might explain why the empirical analysis in Chapter 3 found no significant effect of operating oil or natural gas pipelines in either direction, as the dyad-year dataset covered the Cold War period, or the years 1946 to 1992 – a wide-enough time span to include multiple regime changes within many dyads. In this setting, cross-border pipelines may not unilaterally increase or decrease the incidence of interstate conflict within a dyad. While cross-border pipelines carry an objective material value for either state within a dyad, shocks exogenous to the pipeline relationship can affect the subjective value of the pipeline.

Explanation Two: Selection Bias

Because investors are often dissuaded from supporting cross-border pipeline projects that carry significant "political risk," one might expect for cross-border pipelines to be built typically within dyads that are expected to be relatively peaceful and stable over the lifetime of the pipeline. As discussed in Chapters 1 and 2, cross-border pipelines involve several economic and legal hurdles that render pipelines risky for investors. First, the monopolistic properties of pipelines - high fixed costs and economies of scale on the account of average costs of capacity that decrease as capacity increases - create incentives for dyads to build small numbers of large-capacity pipelines instead of large numbers of small-capacity pipelines.[11] Fewer cross-border pipelines per dyad means

[11] Makholm, *The Political Economy of Pipelines*, 29.

greater dependence of each state on each pipeline and thus greater vulnerability to the "hold up." Second, the business model behind operating a pipeline - making large, upfront, and fixed investments in return for profits generated through decades of operation at low variable costs - fosters an "obsolescing bargain" where states can expropriate pipelines after construction and operate them inefficiently for a profit.[12] Third, the "multilateral challenge," lack of legitimate international government organizations for normalizing energy transit, and dearth of binding arbitration processes renders cross-border pipelines vulnerable to expropriation or "hold up."[13] These three problems explain why assessing and avoiding political risk prior to committing funds to the construction of a pipeline drives investor behavior, and why several pipeline projects today have not yet been pursued. If a participating state has set a precedent for failing to protect private property, investors may halt a cross-border pipeline project due to political risk. For instance, states rife with "insurgency" or "instability" may be unable to protect private property. Investors have shied away from the Turkmenistan-Afghanistan-Pakistan-India pipeline due to longstanding doubts of the capacity of the Afghanistan government to maintain stability and protect the pipeline.[14]

More importantly, expectations of future conflict between a pair of states also raise the political risk of a cross-border pipeline within the dyad. States with longstanding disputes or disagreements over political or economic issues tend to come into conflict more frequently, and should they possess a cross-border pipeline, the pipeline may become one more avenue through which each states can attempt to exert influence on the

[12] Stevens, "Cross-Border Oil and Gas Pipelines: Problems and Prospects," 15.
[13] "Energy Transit - The Multilateral Challenge."
[14] Stewart Patrick, *Weak Links: Fragile States, Global Threats, and International Security* (Oxford ; New York: Oxford University Press, 2011), 82.

other - a "continuation of policy by other means." Repeated disruption of pipeline flow could render the pipeline unprofitable for investors. For example, it is unlikely that investors would have built the Greater Nile Oil Pipeline after South Sudan became an independent state in 2011, as the terms of the independence left many dyadic issues unresolved, including the conflict in Darfur, the exact borders in oil-rich regions such as Abyei, and either state's support for rebels and militias in the other state's territory.[15] Of course, the two states inherited a cross-border oil pipeline from the original Sudanese state, which is why the cross-border pipeline exists today.

Naturally, investors, firms, and states try to mitigate some of this political risk by adding certain stipulations to the intergovernmental agreements signed by the participating states. For example, during initial negotiations for the Iran-Pakistan-India pipeline, fears that Pakistan would "hold up" the pipeline to prevent India from receiving Iranian gas imports during political disagreements between India and Pakistan led to a clause in the potential intergovernmental agreement that Pakistan would receive transit fees for natural gas that India received, not for natural gas that Iran pumped.[16] Still, given that the IPI pipeline has not yet been built, such stipulations may not be enough to convince investors.[17]

However, investor assessment and foresight are not perfect. First, investors who back cross-border pipelines may not be able to predict shocks to the dyad that are exogenous to the cross-border pipeline but may affect how it is valued by the states

[15] Gettleman, "Sudan and South Sudan Sign Accord, but Several Issues Are Unresolved."
[16] Mehdi Parvizi Amineh and Yang Guang, eds., *The Globalization of Energy: China and the European Union*, International Comparative Social Studies, v. 21 (Leiden [The Netherlands] ; Boston: Brill, 2010), 168.
[17] Besides Indian concerns over a Pakistani "hold up," Iran's prohibition of foreign ownership and the Iran Sanctions Act have led to deterioration in Iran's energy infrastructure that deters potential investors. See Amineh and Guang, *The Globalization of Energy*, 168 for more.

within the dyad - such as the shocks discussed in the first explanation of washed-out effects, including regime change or shifts in the energy market. Second, investors interested in exporting oil or natural gas from a particular country may have no alternative options to building a cross-border pipeline through an unstable region or between two countries with less-than-friendly relations. For example, the profitability of oil and natural gas projects located in developing countries rests upon exporting the produced oil or natural gas to either other countries or the international market, as domestic markets within those producing countries tend to be too small to financially justify production and therefore investment.[18] In particular, landlocked developing countries (LLDCs), such as the oil-rich and gas-rich republics of post-Soviet Central Asia, must specifically build pipelines through gateway countries to export their produced resources to international markets. Because of the poor bargaining position in which they find themselves, LLDCs pay an average of 30 percent of their annual gross domestic product in pipeline transit fees - more than twice that of the average developing country.[19] If they develop and believe that their resources have become more important to the international market, LLDCs may attempt to renegotiate the terms of transit for reductions in transit fees, which could result in "hold ups" and conflict.

Third, investors may be willing to make a gamble on the future relationship of a dyad under the right circumstances. The discovery of "one of the last great oil and gas frontiers" in Iraqi Kurdistan - potentially amounting up to 45 billion barrels of oil and 201 trillion cubic feet of gas - pushed over 40 MNEs to invest in the development of oil and gas production in the area, even though long-term profitability is currently contingent on

[18] Stevens, "Cross-Border Oil and Gas Pipelines: Problems and Prospects," 22.
[19] Jean-François Arvis, "Connecting to Compete 2012: Trade Logistics in the Global Economy," Connecting to Compete (The World Bank, 2012).

continued use of the pipeline from Iraqi Kurdistan into Turkey.[20] As mentioned in Chapter 1, a quick and "surprising shift" towards positive relations between Turkey and Iraqi Kurdistan made the pipeline project possible. Conflict over transit fees, the Turkish government's treatment of its own Kurdish population, and possible sheltering of PKK militants in Iraqi Kurdistan could result in a similar quick but less surprising shift towards negative relations, which may jeopardize the pipeline route.[21] However, the prospect of revenues and the strength of Turkey-Iraqi Kurdistan relations at the time of investment likely convinced MNEs that the export route would be viable for decades to come.

Beyond political risk, cross-border pipeline projects require decades of planning, multilateral negotiations and contracts involving the participating states and firms, and agreement over the pipeline's right and way and terms of transit, including routes, prices, and potential off-take volumes.[22] Certainly, openly-hostile countries are unwilling to come to the negotiating table for such a project. One may also expect that political tensions within the dyad decrease the likelihood that the countries can negotiate seriously for years and trust one another to fulfill the terms of the arrangement should they build the pipeline. At the same time, because historical examples demonstrate that even states with adversarial relations can negotiate and agree upon terms,[23] the threshold at which tensions become obstructive for the negotiations is unclear. Overall, the context of a cross-border pipeline – particularly its necessity – can evidently sway investors to fund or oppose a cross-border pipeline.

[20] Ottaway and Ottaway, "How the Kurds Got Their Way."
[21] Zaman, "The Iraqi Kurds' Waning Love Affair with Turkey."
[22] "Energy Transit - The Multilateral Challenge."
[23] Kandiyoti, *Pipelines*, 21–26.

Further Analyses and Final Comments

This thesis produced the first quantitative analysis of the effect of cross-border pipelines on the incidence of interstate conflict. The above hypotheses can explain the null results of the analysis; in general, each explanation contends that the context of the dyad in which a cross-border pipeline operates significantly influences whether the pipeline increases or decreases conflict among the participating states. If the context of a dyad shapes each state's subjective perception of the material value of the cross-border pipeline, it is likely that it does so for the material value of other joint infrastructure.

To be fair, future empirical analyses of how cross-border oil and natural gas pipelines affect the incidence of interstate conflict could make several adjustments to increase the likelihood of isolating a pattern. However, the adjustments vary in degree of both possibility and difficulty, meaning that not all conceivable empirical analyses are even possible or attractive to potential researchers. The more possible adjustments involve collecting more data of the same type or filtering the dataset. First, if the statistical effect of operating pipelines on interstate conflict is small, replicating the analysis conducted in this thesis on a larger dataset may uncover the weak pattern. This could be accomplished using a dataset that covers a time period longer than 1946 to 1992, and one that investigates a greater number of dyads. Second, requiring MIDs included in the dyad-year dataset to pass a certain threshold of hostility may eliminate MIDs that are minor and unavoidable, such as the series of MIDs between the US and Canada in the latter half of the twentieth century over fishing rights that ended up as high-leverage points in the initial regressions, leaving only larger MIDs that reflect serious conflict between states. Third, one could include an indicator variable for the number of operating

pipelines that were "inherited" as opposed to built by the dyad; use of this data could provide insight into how regime change within a dyad with existing cross-border pipelines shapes the character of the pipeline relationship.[24]

On the other hand, the more difficult adjustments involve collecting more granular data. Collecting and categorizing the terms of transit of each cross-border pipeline would be impossible, as many of the exact terms or intergovernmental agreements are not public. Profiling the ownership and operation of each pipeline, such as the stakes held by private as opposed to public partners, would require extraordinary data collection, as would acquiring the year-by-year volumes of any one cross-border pipeline, let alone 307.

[24] One could also conduct a natural experiment comparing the incidence of conflict among successor states that inherited joint cross-border infrastructure from the parent state to those that did not.

Bibliography

Ali, Saleem. "Energizing Peace: The Role of Pipelines in Regional Cooperation." Brookings Doha Center Analysis Papers. Saban Center at Brookings: Brookings Institution, July 2010.

Amineh, Mehdi Parvizi, and Yang Guang, eds. *The Globalization of Energy: China and the European Union*. International Comparative Social Studies, v. 21. Leiden [The Netherlands] ; Boston: Brill, 2010.

Antràs, Pol, and Stephen R. Yeaple. "Multinational Firms and the Structure of International Trade." In *Handbook of International Economics*, 4:55–130. Elsevier, 2014. http://linkinghub.elsevier.com/retrieve/pii/B9780444543141000021.

"AP: Sudan Inaugurates Oil Pipeline." *Alexander's Gas & Oil Connections*, May 31, 1999. http://www.gasandoil.com/news/africa/b557d7bd49e223870a4ddce013c58f50.

Arkes, Hal R., and Peter Ayton. "The Sunk Cost and Concorde Effects: Are Humans Less Rational than Lower Animals?" *Psychological Bulletin* 125, no. 5 (1999): 591–600. doi:10.1037/0033-2909.125.5.591.

Aronow, Peter M., Cyrus Samii, and Valentina A. Assenova. "Cluster–Robust Variance Estimation for Dyadic Data." *Political Analysis* 23, no. 4 (October 2015): 564–77. doi:10.1093/pan/mpv018.

Arvis, Jean-François. "Connecting to Compete 2012: Trade Logistics in the Global Economy." Connecting to Compete. The World Bank, 2012.

"A Tortuous Triangle." *The Economist*, December 22, 2012. http://www.economist.com/news/middle-east-and-africa/21568760-governments-turkey-iraq-and-iraqi-kurdistan-play-dangerous-game.

Bala-Gbogbo, Elisha. "Nigeria Power Plans Must Overcome Gas-Pipeline Sabotage." *Bloomberg.com*, June 10, 2015. http://www.bloomberg.com/news/articles/2015-06-10/nigeria-power-plans-must-overcome-gas-pipeline-sabotage.

Barbieri, K. "Economic Interdependence: A Path to Peace or a Source of Interstate Conflict?" *Journal of Peace Research* 33, no. 1 (February 1, 1996): 29–49. doi:10.1177/0022343396033001003.

Bariyo, Nicholas. "Zambian Govt Seeks To Recapitalize Tazama Oil Pipeline." *Dow Jones Commodities News*, September 29, 2009. http://downstreamtoday.com/news/article.aspx?a_id=18422&AspxAutoDetectCookieSupport=1.

Barton, Barry, ed. *Energy Security: Managing Risk in a Dynamic Legal and Regulatory Environment*. Oxford ; New York: Oxford University Press, 2004.

Bennett, D. Scott, and Allan C. Stam. "*Eugene* : A Conceptual Manual." *International Interactions* 26, no. 2 (January 2000): 179–204. doi:10.1080/03050620008434965.

Beyene, H. G. "Does International Trade Reduce Political Disputes?" *Foreign Trade Review* 50, no. 2 (May 1, 2015): 99–117. doi:10.1177/0015732515572058.

Binder, David. "Soviet Offers to Extend Pipeline to West Germany." *The New York Times*, May 6, 1969. ProQuest Historical Newspapers: The New York Times.

Blinken, Antony J. *Ally versus Ally: America, Europe, and the Siberian Pipeline Crisis*. New York: Praeger, 1987.
Bösch, Frank. "Energy Diplomacy: West Germany, the Soviet Union and the Oil Crises of the 1970s," 2014. doi:10.12759/hsr.39.2014.4.165-185.
Cagaptay, Soner, Christina Fidan, and Ege Sacikara. "Turkey and the KRG: An Undeclared Economic Commonwealth." *The Washington Institute*, March 16, 2015. http://www.washingtoninstitute.org/policy-analysis/view/turkey-and-the-krg-an-undeclared-economic-commonwealth.
Cagaptay, Soner, and Ali Koknar. "Turkish Troops in Northern Iraq?" *The Washington Institute*, June 8, 2007. http://www.washingtoninstitute.org/policy-analysis/view/turkish-troops-in-northern-iraq.
Cayrade, Patrick. "Investments in Gas Pipelines and Liquefied Natural Gas Infrastructure. What Is the Impact on the Security of Supply?" *SSRN Electronic Journal*, 2004. doi:10.2139/ssrn.593721.
Cockburn, Patrick. "Turkey Imposes Sanctions on Iraqi Kurdistan in Bid to Halt PKK." *The Independent*, November 2, 2007. http://www.independent.co.uk/news/world/europe/turkey-imposes-sanctions-on-iraqi-kurdistan-in-bid-to-halt-pkk-398680.html.
Colgan, Jeff D. "Oil and Revolutionary Governments: Fuel for International Conflict." *International Organization* 64, no. 04 (October 2010): 661–94. doi:10.1017/S002081831000024X.
Colin Cameron, A., and Douglas L. Miller. "A Practitioner's Guide to Cluster-Robust Inference." *Journal of Human Resources* 50, no. 2 (2015): 317–72. doi:10.3368/jhr.50.2.317.
Copeland, Dale C. "Economic Interdependence and War: A Theory of Trade Expectations." *International Security* 20, no. 4 (1996): 5. doi:10.2307/2539041.
Curtis, Kenneth M., and John E. Carroll. *Canadian-American Relations: The Promise and the Challenge*. Lexington, Mass: Lexington Books, 1983.
Department Of State. The Office of Website Management, Bureau of Public Affairs. "Canada 06/02." *U.S. Department of State*, January 1, 2004. http://www.state.gov/outofdate/bgn/canada/26535.htm.
de Vries, M. S. "Interdependence, Cooperation and Conflict: An Empirical Analysis." *Journal of Peace Research* 27, no. 4 (November 1, 1990): 429–44. doi:10.1177/0022343390027004007.
Elkins, Zachary, Andrew T. Guzman, and Beth A. Simmons. "Competing for Capital: The Diffusion of Bilateral Investment Treaties, 1960–2000." *International Organization* 60, no. 04 (October 2006). doi:10.1017/S0020818306060279.
"Energy Transit - The Multilateral Challenge." G8 Energy Ministerial Meeting Moscow: Energy Charter, April 1, 1998.
"Exclusive: Turkey, Iraqi Kurdistan Clinch Major Energy Pipeline Deals." *Reuters*, November 6, 2013. http://www.reuters.com/article/us-turkey-iraq-kurdistan-idUSBRE9A50HR20131106.
Fellows, Lawrence. "Soviet Sets Terms to Sell Gas To West Germany." *The New York Times*, December 1, 1969. ProQuest Historical Newspapers: The New York Times.

Flora. “FOREIGN AFFAIRS; SOVIET-GERMAN BRIDGE.” *The New York Times*, November 27, 1981, sec. Opinion. http://www.nytimes.com/1981/11/27/opinion/foreign-affairs-soviet-german-bridge.html.

Fordham, Benjamin. “Militarized Interstate Disputes Not Involving a U.S. Use of Force,” n.d.

Gartzke, Erik. “The Capitalist Peace.” *American Journal of Political Science* 51, no. 1 (January 2007): 166–91. doi:10.1111/j.1540-5907.2007.00244.x.

Gartzke, Erik, and Quan Li. “Measure for Measure: Concept Operationalization and the Trade Interdependence-Conflict Debate.” *Journal of Peace Research* 40, no. 5 (September 1, 2003): 553–71. doi:10.1177/00223433030405004.

Gasiorowski, Mark J. “Economic Interdependence and International Conflict: Some Cross-National Evidence.” *International Studies Quarterly* 30, no. 1 (March 1986): 23. doi:10.2307/2600435.

Gettleman, Jeffrey. “After Years of Struggle, South Sudan Becomes a New Nation.” *The New York Times*, July 9, 2011. http://www.nytimes.com/2011/07/10/world/africa/10sudan.html.

———. “Sudan and South Sudan Sign Accord, but Several Issues Are Unresolved.” *New York Times*. September 28, 2012.

———. “SUDANS’ OIL FEUD RISKS SHATTERING A FRAGILE PEACE: PROXY FIGHTS FLARE UP Vague Accord Seeks to Stave Off Slide to an All-Out Conflict.” *New York Times*. February 11, 2012.

———. “Two Sudans Reach Deal on Fees for Oil Pipelines.” *New York Times*. August 5, 2012.

Gökay, Bülent, ed. *The Politics of Oil: A Survey / Edited by Bülent Gökay*. 1st ed. Politics of ... Series. London ; New York: Routledge, 2006.

Green, Donald P., Soo Yeon Kim, and David H. Yoon. “Dirty Pool.” *International Organization* 55, no. 2 (June 1, 2001): 441–68. doi:10.1162/00208180151140630.

Griffiths, I. L. “THE TAZAMA OIL PIPELINE.” *Geography* 54, no. 2 (1969): 214–17.

Gunter, Michael M. *Out of Nowhere: The Kurds of Syria in Peace and War*. London: Hurst & Company, 2014.

Hamilton, Rebecca. “Awaiting Independence Vote, Southern Sudan Has High Hopes.” *Pulitzer Center*, November 28, 2010. http://pulitzercenter.org/articles/southern-sudanese-say-independence-vote-will-improve-life.

Hardt, John, and Donna Gold. “The Soviet Gas Pipeline in Perspective.” Special National Intelligence Estimate. Central Intelligence Agency, 1982.

Hayes, Mark H., and David G. Victor. “Factors That Explain Investment in Cross-Border Natural Gas Transport Infrastructures: A Research Protocol for Historical Case Studies.” Center for Environmental Science and Policy: Stanford University, 2004.

Högselius, Per. “Introduction.” In *Red Gas*, 1–11. Palgrave Macmillan Transnational History Series. Palgrave Macmillan US, 2013. http://link.springer.com/chapter/10.1057/9781137286154_1.

Holz, Franziska, Philipp M. Richter, and Ruud Egging. “The Role of Natural Gas in a Low-Carbon Europe: Infrastructure and Regional Supply Security in the Global Gas Model.” *SSRN Electronic Journal*, 2013. doi:10.2139/ssrn.2239652.

Horsnell, Paul. “Caspian Oil and Gas: A Game, If Not a Great Game.” The Oxford Institute for Energy Studies, January 1, 1999. http://www.oxfordenergy.org/1999/01/caspian-oil-and-gas-a-game-if-not-a-great-game/.

Jenkins, Gareth. “Unwelcome Guests: The Turkish Military Bases in Northern Iraq.” *The Jamestown Foundation Terrorism Monitor*, March 24, 2008. http://www.jamestown.org/single/?no_cache=1&tx_ttnews%5Btt_news%5D=4807.

Johnson, Keith. “What’s Really Happening With the Yukos Case.” Foreign Policy. Council on Foreign Relations, June 19, 2015. https://foreignpolicy.com/2015/06/19/whats-really-happening-with-the-yukos-case-russia-putin-belgium-france/.

Jones, D. M., S. A. Bremer, and J. D. Singer. “Militarized Interstate Disputes, 1816-1992: Rationale, Coding Rules, and Empirical Patterns.” *Conflict Management and Peace Science* 15, no. 2 (January 1, 1996): 163–213. doi:10.1177/073889429601500203.

Kandiyoti, R. *Pipelines: Flowing Oil and Crude Politics*. London ; New York : New York: I.B. Tauris ; In the United States of America and Canada distributed by Palgrave Macmillan, 2008.

Keefer, Edward C., and Monica L. Belmonte, eds. *Iran; Iraq, 1973-1976*. Foreign Relations of the United States 1969/76,27. Washington, DC: US Gov. Print. Off, 2012.

Krugel, Lauren. “Enbridge Pipeline Sabotage Prompts Security Boost.” *The Huffington Post*, January 17, 2016. http://www.huffingtonpost.ca/2016/01/17/enbridge-pipeline-sabotage_n_9002984.html.

Krylov, N. A., ed. *The Oil Industry of the Former Soviet Union: Reserves and Prospects, Extraction, Transportation*. Amsterdam: Gordon & Breach, 1998.

Lacey, Marc. “U.S. Urges Sudan to Divide Oil Income as Step to Peace.” *New York Times*. May 5, 2002.

Leal-Arcas, Rafael, and Mariya Peykova. “Energy Transit Activities: Collection of Intergovernmental Agreements on Oil and Gas Transit Pipelines and Commentary.” Legal Studies Research Papers. Queen Mary University of London, School of Law, December 2014.

Leal-Arcas, Rafael, and Juan Rios. “How Can the EU Diversify Its Energy Supply to Improve Its Energy Security?” Legal Studies Research Papers. Queen Mary University of London, School of Law, 2015.

Lomsadze, Giorgi. “Post-Iran Deal, Azerbaijan Eyes Energy Transit Opportunities.” *EurasiaNet*. July 15, 2015. http://www.eurasianet.org/node/74236.

Luft, Gal, and Anne Korin. “Terror’s next Target.” *Institute for the Analysis of Global Security*, March 28, 2005. http://www.iags.org/n0111041.htm.

Makholm, Jeff D. *The Political Economy of Pipelines: A Century of Comparative Institutional Development*. Chicago ; London: The University of Chicago Press, 2012.

Maoz, Zeev. “The Effects of Strategic and Economic Interdependence on International Conflict Across Levels of Analysis.” *American Journal of Political Science* 53, no. 1 (January 2009): 223–40. doi:10.1111/j.1540-5907.2008.00367.x.

Masseron, Jean, Nissim Marshall, and Gillian Harvey-Bletsas, eds. *Petroleum Economics*. 4th ed., updated and expanded. Institut Français Du Pétrole Publications. Paris: Editions Technip, 1990.

McMillan, E. M. "Independence and Conflict." *Mershon International Studies Review* 41, no. 1 (May 1997): 33–58. doi:10.1111/1521-9488.511997051.

Moran, Daniel, and James A. Russell, eds. *Energy Security and Global Politics: The Militarization of Resource Management*. Routledge Global Security Studies 6. London ; New York: Routledge, 2009.

Nield, Richard. "Politics and Untapped Potential." *MEED: Middle East Economic Digest* 48, no. 28 (July 9, 2004): 29–31.

Nougayrède, Delphine. "Binding States: A Commentary on State Contracts and Investment Treaties." SSRN Scholarly Paper. Rochester, NY: Social Science Research Network, September 1, 2005. http://papers.ssrn.com/abstract=2374741.

O'Byrne, David, Tamsin Carlisle, and Stuart Elliott. "Bomb Attack on Iraq-Turkey Pipeline Halts Crude Oil Supplies - Oil | Platts News Article & Story." *S&P Global Platts*, July 29, 2015. http://www.platts.com/latest-news/oil/istanbul/bomb-attack-on-iraq-turkey-pipeline-halts-crude-26162030.

Okolo, Philips O., and Ambily Etekpe. "Oil Pipeline Vandalization and the Socio-Economic Effects in Nigeria's Niger Delta Region." *SSRN Electronic Journal*, 2010. doi:10.2139/ssrn.1723169.

Oneal, John R. "Measuring Interdependence and Its Pacific Benefits: A Reply to Gartzke & Li." *Journal of Peace Research* 40, no. 6 (November 1, 2003): 721–25. doi:10.1177/00223433030406007.

Oneal, J. R., F. H. Oneal, Z. Maoz, and B. Russett. "The Liberal Peace: Interdependence, Democracy, and International Conflict, 1950-85." *Journal of Peace Research* 33, no. 1 (February 1, 1996): 11–28. doi:10.1177/0022343396033001002.

Ottaway, Marina, and David Ottaway. "How the Kurds Got Their Way." *Foreign Affairs* 93, no. 3 (May 2014): 139–48.

Patrick, Stewart. *Weak Links: Fragile States, Global Threats, and International Security*. Oxford ; New York: Oxford University Press, 2011.

Peimani, Hooman. *The Caspian Pipeline Dilemma: Political Games and Economic Losses*. Westport, Conn: Praeger, 2001.

Perović, Jeronim, Robert W. Orttung, and Andreas Wenger, eds. *Russian Energy Power and Foreign Relations: Implications for Conflcit and Cooperation*. CSS Studies in Security and International Relations. London ; New York: Routledge, 2009.

"Pipeline Sabotaged by PKK Costing KRG $14m a Day in Losses: Minister." *Rudaw*, February 23, 2016. http://rudaw.net/english/kurdistan/230220165.

"President Bashir Orders South Sudan Border to Be Opened." *BBC News*, April 12, 2013. http://www.bbc.com/news/world-africa-22119556.

Quan Li. "Democracy, Autocracy, and Expropriation of Foreign Direct Investment." *Comparative Political Studies* 42, no. 8 (August 1, 2009): 1098–1127. doi:10.1177/0010414009331723.

Ramamurti, Ravi. "The Obsolescing 'Bargaining Model'? MNC-Host Developing Country Relations Revisited." *Journal of International Business Studies* 32, no. 1 (March 2001): 23–39. doi:10.1057/palgrave.jibs.8490936.

Russett, Bruce M., and John R. Oneal. *Triangulating Peace: Democracy, Interdependence, and International Organizations*. New York: Norton, 2001.
Salameh, Mamdouh G. "Iraq: An Oil Giant Constrained by Infrastructure & Geopolitics." *SSRN Electronic Journal*, 2013. doi:10.2139/ssrn.2371770.
Shabad, Theodore. "Work Proceeding on Soviet Pipeline." *The New York Times*, February 21, 1982. ProQuest Historical Newspapers: The New York Times.
"South Sudan Strikes New Deal with Sudan on Oil Transit Charges." *Sudan Tribune*. February 3, 2016. http://www.sudantribune.com/spip.php?article57895.
"South Sudan Vows to Shut down Oil Fields, Pipeline over High Transportation Fees." *Sudan Tribune*, January 18, 2016. http://www.sudantribune.com/spip.php?article57726.
Stanley, Bruce, and Khalid Al Ansary. "Cash-Strapped Iraqi Kurds to Start Gas Exports to Turkey in 2016." *Bloomberg.com*, January 13, 2016. http://www.bloomberg.com/news/articles/2016-01-13/cash-strapped-iraqi-kurds-to-start-gas-exports-to-turkey-in-2016.
Stern, Jonathan. "Gas Pipeline Co-Operation between Political Adversaries: Examples from Europe." Submission to Korea Foundation. Chatham House, January 2005.
Stevens, Paul. "Cross-Border Oil and Gas Pipelines: Problems and Prospects." Joint UNDP/World Bank Energy Sector Management Assistance Programme, June 2003.
Stevens, Paul, and Royal Institute of International Affairs. *Transit Troubles: Pipelines as a Source of Conflict*. [London, England]: Chatham House, 2009.
"Striking Pipeline, Kurdish Militants Deal Blow to Fellow Kurds." *Foreign Policy*. Accessed May 30, 2016. https://foreignpolicy.com/2015/07/30/kurdish-militants-strike-pipeline-deal-blow-to-fellow-kurds/.
"Sudan and South Sudan Make Progress: An Oil Pipeline Deal Is a Good Step, but the Two Countries Face Many Other Volatile Issues." *New York Times*. August 10, 2012.
"Sudan and S Sudan Agree to Protect Oilfields." *Al Jazeera*, January 7, 2014. http://www.aljazeera.com/news/africa/2014/01/cloneofsudanese-president-juba-discuss-crisis-20-201416134227113126.html.
"Suspected Vandals Sabotage Shell's Crude Pipeline One Week after Repair." *Premium Times Nigeria*, July 13, 2013. http://www.premiumtimesng.com/news/140861-suspected-vandals-sabotage-shells-crude-pipeline-one-week-after-repair.html.
Tagliabue, John. "West Germans Planning Soviet Pipeline Talks." *The New York Times*, July 5, 1980. ProQuest Historical Newspapers: The New York Times.
Tastekin, Fehim. "KRG Trench Divides Syrian, Iraqi Kurds." *Al-Monitor*, April 21, 2014. http://www.al-monitor.com/pulse/originals/2014/04/krg-trench-divides-syrian-iraqi-kurds.html.
Taylor, Rob. "Pipeline Politics in Syria." Armed Forces Journal, March 21, 2014. http://www.armedforcesjournal.com/pipeline-politics-in-syria/.
"The New State of South Sudan: After the Celebrations, the New Country and Its Supporters Cannot Relax." *New York Times*. July 9, 2011.
"The Suez Crisis, 1956." *Office of the Historian: US Department of State*. Accessed May 20, 2016. https://history.state.gov/milestones/1953-1960/suez.
Thies, Wallace J. *Why NATO Endures*. New York: Cambridge University Press, 2009.

Trivett, Vincent. “Oil-Rich South Sudan Has Hours To Choose Between North Sudan, China And The U.S.” *Business Insider*, July 8, 2011. http://www.businessinsider.com/southern-sudan-independence-2011-7.

van Wilgenburg, Wladimir. “Syrian Kurdish Party Calls on Turkey, KRG to End Embargo.” *Al-Monitor*, November 25, 2013. http://www.al-monitor.com/pulse/originals/2013/11/syria-kurds-embargo-end-turkey-border-crossing-trade.html.

Vernon, Raymond. “Sovereignty at Bay: The Multinational Spread of U. S. Enterprises.” *The International Executive* 13, no. 4 (1971): 1–3. doi:10.1002/tie.5060130401.

Vinogradov, Sergei. “Cross-Border Pipelines in International Law.” *Natural Resources & Environment* 14, no. 2 (1999): 75–80.

Ward, M. D. “Book Review.” *Comparative Political Studies* 35, no. 4 (May 1, 2002): 484–88. doi:10.1177/0010414002035004005.

Wynne-Jones, Ros. “Happy Birthday South Sudan?” *The Independent*, July 6, 2012. http://www.independent.co.uk/news/world/africa/happy-birthday-south-sudan-7912244.html.

Yegorov, Yuri, and Franz Wirl. “Gas Transit, Geopolitics and Emergence of Games with Application to CIS Countries.” *SSRN Electronic Journal*, 2010. doi:10.2139/ssrn.1560563.

Zaman, Amberin. “The Iraqi Kurds’ Waning Love Affair with Turkey.” *Al Monitor*, September 1, 2015. http://www.al-monitor.com/pulse/originals/2015/09/turkey-iraq-kurdistan-krg-pkk-love-affair-over.html#.