The Pennsylvania State University

The Graduate School

College of the Liberal Arts

STRATEGIES OF ENVIRONMENTAL TREATY PARTICIPATION BY AUTHORITARIAN REGIMES

A Dissertation in

Political Science

by

Benjamin E. Bagozzi

Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Doctor of Philosophy

August 2013

The dissertation of Benjamin E. Bagozzi was reviewed and approved* by the following:

Bumba Mukherjee
Associate Professor of Political Science
Dissertation Advisor
Chair of Committee

Philip Schrodt
Professor of Political Science

Christopher Zorn
Liberal Arts Research Professor of Political Science

Karen Fisher-Vanden
Associate Professor of Environmental and Resource Economics

Lee Ann Banaszak
Professor and Director of Graduate Studies

*Signatures are on file in the Graduate School.

Abstract

Why do some authoritarian countries hastily join international environmental agreements (IEAs) while many others choose to delay IEA membership indefinitely? To answer this question, I formally model an authoritarian government's decision to join an IEA as the result of a strategic interaction between an autocrat and domestic "brown" industry owners. The model reveals that IEA ratification (uniquely) ties the hands of constitutionally unconstrained authoritarian leaders with high levels of brown industry dependence, guaranteeing that such autocrats make good on their commitments to provide cost-offsetting compensation to brown industry owners ex-post to an IEA's ratification. This credible commitment, in turn, compels brown industry owners to decrease their levels of government-directed opposition (in equilibrium), thereby enabling constitutionally unconstrained autocrats with high industry dependence to effectively prolong their tenure in office via IEA membership. On the other hand, the model also suggests that constitutionally constrained autocracies lack the incentives to use IEAs as signaling mechanisms, and thus higher levels of brown industry dependence will thereby raise the IEA ratification costs for these regimes. Hence, autocracies with low constitutional constraints will ratify IEAs more quickly as their reliance on brown industry increases, and will survive longer in office as a result, whereas the opposite holds true for constitutionally constrained autocrats. Using a novel data set of monthly IEA-ratification patterns among authoritarian regimes, I find robust empirical support for each prediction.

Contents

List of Figures

List of Tables

Acknowledgements

I would like to acknowledge my advisor and dissertation chair, Bumba Mukherjee, as well as my other committee members, Karen Fisher-Vanden, Phil Schrodt, and Chris Zorn, for their helpful comments and suggestions during this dissertation process. Thank you for your help and guidance. I greatly appreciate the thoughtful feedback and overall enthusiasm that you provided in helping me to develop my dissertation ideas and conduct this research—as well as your considerable support during my graduate studies more generally. I would also like to acknowledge Thomas Brawner, Xun Cao, Burcin Tamer, and Joe Wright for their insightful comments on earlier drafts (and presentations) of this research project. Your helpful suggestions have improved my dissertation considerably.

Last but not least, I am very fortunate to have had an enormous amount of love and support from friends and family during my time as a graduate student at Penn State University. First and foremost, I would like to sincerely thank my wife for her unconditional love, unyielding patience, and unwavering support. Thank you Katie, for always being there fore me, and for helping me to smile through even the most stressful of days. I am also deeply indebted to my father, mother, and sister for providing me with a lifetime of enduring love, support, and wisdom. Thank you Rick, Bev, and Anna for always believing in me.

1

Introduction

1.1 A Puzzling Case

With the opening of the 2002 World Summit on Sustainable Development in Johannesburg, an epic showdown loomed between advocates of international trade and supporters of international environmental politics. The moment had finally arrived for developing and developed nations to decide on whether (or not) to grant the World Trade Organization's (WTO) free trade rules primacy over the numerous environmental regulations found within the world's most prominent international environmental agreements (IEAs). The stakes were high, as the precedent set by a decision in favor of trade would have "called into question the Kyoto Protocol, the Cartagena Protocol on Biosafety and the Stockholm Convention on POPs (persistent organic compounds) [and] might even have nullified future multilateral environmental agreements" (1). By the sixth day of the Summit, all appeared lost for the Summit's environmental proponents, and many such advocates had resigned to accept a dire fate for IEAs (2, 3, 4, 5). Yet, at the eleventh hour, an "impassioned midnight plea" by one developing country, "arguing that some things were more important than mere trade," finally "turned the tide," and ensured that "a dastardly plan to allow trade to take precedence over the environment was dashed" (1); in an effort that was later described by one UN official as "a wonderful exercise in human democracy" (6). That country was

Ethiopia, which at the time was administered by a civilian dictatorship[1] that fell within the bottom (i.e. least "democratic") 25% of countries worldwide for civil liberties,[2] political rights,[3] physical integrity rights,[4] and empowerment rights,[5] in addition to being listed as a frequent practitioner of torture (9), extrajudicial killings (9), environmental negligence (10, 11, 12, 13, 17-27), and electoral fraud (14, 15). What was an autocracy such as Ethiopia doing on such a prominent international stage, fighting for the rights of IEAs?

My dissertation is motivated by this very question: why do *some* authoritarian countries hastily pursue, support, and defend international environmental treaties? In developing a theoretical response to this question, I hope to improve our scientific understandings of (i) the environmental politics of authoritarian governments, broadly defined, and (ii) the more specific strategies and consequences of authoritarian countries' (non-)participation in *international environmental regimes*. To understand why asking this question is intriguing, as well as to appreciate why answering it is important, I situate my research project within the extant literature on these topics immediately below. Following this exposition, the current chapter briefly outlines the methodological approach and research design that I use to answer my research question, and then summarizes my key findings thereof. Finally, I conclude my introductory chapter with a more explicit road-map of what is to come.

[1]As defined by (7). From this point forward, a country-year was considered to be an authoritarian country (i.e. an autocracy), if that country was coded as non-democratic for that year based on the binary autocracy-democracy classification developed by (7).

[2]Based upon the *Civil Liberties* index developed by (8), which encompasses individuals' freedom of expression, belief, association, organization, and personal autonomy, in addition to the rule of law (8).

[3]Based upon the *Political Rights* index developed by (8), which encompasses individual freedoms to compete for public office, to join political parties and organizations, to vote freely for distinct alternatives in legitimate elections, and to elect individuals who have a decisive impact on public policies and are accountable to the electorate (8).

[4]Based upon the *Physical Integrity Rights Index* developed by (9), which aggregates individual (ordinal) measures of political imprisonment, disappearances, torture, and extrajudicial killings.

[5]Based upon the *Empowerment Rights Index* developed by (9), which aggregates individual (ordinal) measures of freedom of religion, political participation, worker's rights, freedom of speech, and freedom of movent.

1.2 Motivation

To begin to answer the question posited above, one must first understand its relevance to existing theories of international agreements, as well as to the broader fields of international institutions and international relations (IR). International institutions have long featured prominently within the study of IR, chiefly due to the belief that these institutions can elicit cooperation among nation-states (16, 17, 18, 19). Operationally, researchers in this area have come to define international institutions as "explicit arrangements, negotiated among international actors, that prescribe, proscribe, and/or authorize behavior" (20, 762), which accordingly encompasses formal organizations and agreements such as the WTO and the United Nations Framework Convention on Climate Change (UNFCCC), in addition to less centralized international treaties such as those pertaining diplomatic immunity (20, 763), the laws of war (21), or criminal extradition.[1] Whilst employing this operational definition, past scholarly debates over whether such institutions actually "matter" (22, 23, 24, 25, 26) have since given way to more recent waves of scholarship that—after establishing that international agreements do in fact "matter" (19, 27, 28, 29)—have sought to understand *how* international institutions matter in relation to (i) "shaping the behavior of important actors in world politics" (17, 729) or (ii) variation in institutional design and enforcement mechanisms (20, 30, 31, 32, 761). In exploring both lines of inquiry, rationalist and constructivist scholars alike have come to conclude (and demonstrate) that international institutions are critical to countries' abilities to govern global issues-areas as varied as trade (18, 19, 30), monetary relations (28, 33, 34), the rules of war (21), human rights (35, 36), oceans and seas (37, 38), climate change and ozone layer depletion (37, 39, 40, 41), the Antarctic (42), and Outer Space (42, 43).

Given the importance of international agreements, a large body of academic research now exists on the political-economy of these international organizations (17, 27, 29, 44), and one line of inquiry that this literature has recently sought to discern is the politics of international agreement *ratification* (33, 45, 46, 47).

[1] Hereafter, "international agreement," "international institution," and "international treaty" are used interchangeably throughout the text.

Treaty ratification, as defined here, represents the actual moment by which a nation-state formally joins and agrees to adhere to a given international treaty or agreement. In practice, international treaty ratification occurs when a country's national government legally ratifies or accedes to a treaty's instruments (via, e.g., a legislative vote or executive order)—a step that is often distinct from, and subsequent to, the (typically non-binding) initial signing (or formation) of an international treaty. Critically, researchers have come to view international agreement ratification—and the timing of said ratification—as a meaningful outcome of interest within the study of international institutions largely because ratification behaviors can serve as powerful (and comparable) indicators of countries' varying levels of *demand* for agreement membership (33, 47, 48). Indeed, as von Stein succinctly argues in this regard, "in the same way that the timing of Political Action Committees' contributions reveals information about their preferences and calculus (49), the timing of ratification provides information about states' preferences and calculus" (48, 254). Employing this analytical framework, IR scholars have recently used states' ratification behaviors to test theories of international treaty demand across all major issue areas of international relations, including monetary relations (33, 50), human rights (51, 52, 53), international security (54), environmental politics (48, 55), and international trade (56, 57).

Here, existing research has found—predominantly within the issue-areas of trade and human rights—that domestic politics play a pivotal role in countries' treaty ratification decisions, and that democracies, in particular, ratify these types of agreements more quickly and frequently than do authoritarian states (51, 52, 57, 58, 59). For example, in their seminal study of international trade cooperation, Mansfield, Milner, and Rosendorff find that democracies join Preferential Trade Agreements (PTAs) at a higher rate than autocracies,[1] which they suggest arises because democratic elections uniquely constrain politicians in a manner that "prompts democratic rulers to be more cooperative internationally than their nondemocratic counterparts" (58, 478). Mansfield, Milner, and Pevehouse subsequently bolster these findings in reporting that democratic countries are significantly more likely to form PTAs and Free Trade Areas (FTAs), than are authoritarian countries, even after accounting for the effects of veto players

[1] As does Magee (60, 12-13).

on PTA formation (59, 61). In later analyses of the GATT/WTO in particular, Yu and Wong find that WTO accession durations are significantly shorter among countries whose domestic political processes are decidedly more democratic (56), whereas Copelovitch and Ohls conclude that post-colonial democracies join the GATT/WTO more quickly than comparable autocracies, and argue that this finding arises because (i) these democracies place more value on the overseas commitment mechanisms afforded to them by the GATT/WTO or (ii) newly democratized, post-colonial governments uniquely pursue GATT/WTO membership to "lock in economic and political reforms against domestic opposition" (57, 92). Hence, extant findings strongly suggest that—at both the bilateral and multilateral levels—democracies form and join international trade agreements more quickly than do authoritarian states.

With respect to human rights treaties, rationalist and constructivist arguments generally anticipate that democracies will ratify these agreements more hastily due to either strategic or cost-based concerns. For example, and similar to the argument laid forth for WTO ratification above (57), a number of human rights scholars have hypothesized that recently democratized countries will pursue human rights treaties more vigorously than other states in order to "lock-in" liberal political reforms against domestic opponents (51, 62, 63, 476). In this vein, Cole finds that democratization compels faster ratification of the International Human Rights Economic Rights Covenant, and similarly reports that democracies are more likely to ratify the economic and political components of the International Human Rights Covenants, irrespective of recent democratization rates (51).[1] Arguing that (potential) human rights treaty ratifiers instead predominantly weigh the probability of domestic treaty enforcement against a treaty's "collateral consequences" when deciding on an agreement's ratification, Hathaway equivalently demonstrates that 'democracy' increases a government's speed of human rights agreement ratification (52, 588), though she finds that a country's actual human rights record will often moderate this positive relationship. Evidence of more frequent–*and faster*–human rights treaty ratification behaviors among democracies (rather than autocracies) has also recently been reported in studies of the International Criminal Court (ICC) (65) and of the UN

[1] See Landman for similar findings in support of the "lock-in" argument (64).

Convention Against Torture (CAT) (63, 66, 67), although the latter evidence is decidedly more mixed—with some scholars arguing that it is not democracy per se that is compelling faster CAT ratification, but rather, countries' higher levels of (i) empowerment rights (i.e. individual freedoms) and (ii) rules of law (68). Nevertheless, the findings summarized in the current and preceding paragraphs together suggest that there is a strong domestic political component to international agreement ratification, and that this component will often encourage democracies to ratify international treaties more frequently and expeditiously, when compared to authoritarian states.

Less extensively, researchers have recently applied this same approach to IEAs, and have similarly found that (i) domestic politics again clearly matters and (ii) autocracies are generally less likely to ratify IEAs in a timely manner—relative to democratic states (48, 69, 70). In arriving at these findings, IEA-scholars have drawn heavily from not only the broader literature on international agreements (summarized above), but also from extant research on *domestic* environmental politics. Concerning the latter, country-level theories of comparative environmental politics largely characterize domestic environmental quality (and its protection) as a public good, and accordingly deduce that democracies will undertake and enforce more stringent environmental policies than will authoritarian regimes. For instance, McGuire and Olsen theoretically establish that increases in the size of an elite (i.e., democracy) will bring about higher levels of public good provision, and therefore conclude that the size of the ruling class positively affects the provision of public goods such as environmental quality (71).[1] In a similar vein, Fredriksson et al. model 'democracy' as an increase in electoral participation and political competition, and find that through these features, democratic leaders are compelled to better represent public preferences and to accordingly provide more stringent domestic environmental policy (73). As further evidence of this relationship, a large number of empirical studies have subsequently found a positive link between higher democratic freedoms and lower actual air and water pollution

[1] Alternatively, democracies may also better serve the environment through higher provisions of both political rights and freedoms of information. This contention rests on the assumption that freer information flows make democracies more accessible to environmental interest groups and environmental legislation (72).

levels within both developing and developed countries (74, 75, 76, 77).[1] Perhaps most comprehensively in this regard, Li and Reuveny test a multitude of competing theories relating to domestic regime type and environmental performance using five separate measures of environmental performance (carbon dioxide emissions, nitrogen dioxide emissions, deforestation, land degradation, and organic pollution in water), and find that democracy reduces environmental degradation across all five performance indicators (77).

These findings are also highly consistent with contemporary case-study and media based accounts of domestic environmental policy within authoritarian regimes, which largely portray such regimes as environmentally destructive. Here, the Soviet Union has long served as the prototypical example of gross environmental negligence by an authoritarian government, owing to the disastrous environmental policies pursued by the Kremlin during industrialization. News outlets and former Soviet officials have revealed, for instance, that the Soviet Union had "dumped radioactive waste in leaky containers into shallow waters off its north coast for decades while publicly claiming the toxic material was being stored safely on land" (81), had destroyed many of its major rivers and seas with industrial contaminates (82, 83),[2] and ultimately, through pollution, had "rendered nearly one-sixth of Russia unfit for human habitation" (83).[3] Still to this day, the industrialization policies undertaken by the Soviet Union have ensured that the primary former Soviet centers of industrialization encompass nearly half of the top ten (and a full third of the top thirty) most severely polluted places in the world (87, 88). Other Eastern Bloc authoritarian regimes exhibited similar levels of environmental negligence during their own periods of industrialization. As Cole noted in 1991, Communist "Poland has been called the most polluted

[1] Although others have shown that some aspects of this democracy-autocracy finding become insignificant once one accounts for income inequality (78), corruption (79), or parliamentary democracies (80).

[2] Wherein, for example, "[s]o much oil and pesticide was dumped in the rivers leading into the Caspian Sea that sturgeon spawning grounds were damaged, causing a two-thirds cut in the production of caviar," and "[a] huge three-decade-long irrigation project shrunk the Aral Sea in Central Asia to half its former size, releasing tons of seabed salt and dust into the atmosphere and causing a sharp rise in respiratory illnesses" (83).

[3] In addition to widespread air pollution, pesticide exposure, and radioactive contamination (84, 85, 86).

country in the world (89, 90). During the decades of Communist rule, industrial development and full employment were exclusive priorities. Environmental degradation was virtually ignored [...] air and water quality steadily deteriorated to a point where today public health is seriously threatened" (91, 206). Comparable levels of environmental devastation also occurred in East Germany, and under Communist rule in Hungary and Czechoslovakia, wherein the latter country's experiences prompted Václav Havel, the first freely elected president of Czechoslovakia, to lament that "[w]e have laid waste to our soil and the rivers and the forests [...] and we have the worst environment in all of Europe today" (92, 50).

Modern accounts of authoritarian environmental negligence extend well beyond the Soviet and Eastern European command economies discussed in the previous paragraph. In *The River Runs Black: The Environmental Challenge to China's Future*, Economy characterizes China's domestic environmental state as one that is rapidly and irrevocably deteriorating throughout much of the country, amid government officials' conscious neglect of environmental problems in pursuit of economic growth (93).[1] International news reports on China's environmental conditions reinforce Economy's conclusions, with one such report suggesting that "[r]apid industrialisation in the past 30 years has left China, the world's third-largest economy, with some of the world's worst water and air pollution and widespread environmental damage" (96) while another notes that China's "leadership seems to lack the political will to make tackling rampant pollution a top priority" (97).[2] Comparable case-studies and media narratives suggest in turn that African dictatorships have experienced even more acute levels of environmental devastation than China in recent years. As alluded to in the introductory paragraph, wire service and Food and Agricultural Organization (FAO) reports contend that Ethiopia has endured some of the worst levels of toxic waste dumping in all of Africa during its period of authoritarian rule, due in large part to

[1]For similar accounts, also see (94, 95).

[2]These media and case-study accounts are reflective of a broader societal shift towards the (Western) public perception of China as the world's worst modern-day polluter, with one recent English-language Google search of the terms "China" and "pollution" yielding roughly 67,800,000 results, several million more than comparable English-language Google searches for "pollution" and (i) the "United States" (51,00,000), (ii) "India" (49,300,000), or (iii) "Europe" (60,700,000). Note: search conducted by the author on 2/20/2013.

the country's improper disposal of over 3,000 tons of obsolete pesticides, where in one village alone the FAO reportedly "found 5.5 tonnes of pesticides, among them DDT in leaking drums and bags next to dwellings and land where animals were grazing" (11). Recent news accounts similarly reveal that "Zimbabwe, which is already saddled with high air and water pollution, has also become the world's dumping ground for toxic mercury. The country imports recycled mercury and mercury compounds used mainly by the electrical industry and these have increased almost five-fold in the past few years" (98). Taken together, the media and academic sources discussed above therefore paint a dire picture of environmental conditions in authoritarian states.

As mentioned earlier, this observed variation in domestic environmental policies across regime types—together with the extant political economy research on domestic politics and international agreement participation (summarized above)—has largely motivated the academic study of IEA ratification. In extending theories of domestic environmental politics to the international level, researchers have predominantly argued that autocracies' higher levels of domestic environmental negligence should also hold within the arenas of IEA ratification and IEA compliance, which together can be seen as forms of public goods in their own right.[1] In perhaps the first theoretical extension of this sort, Congleton characterizes autocrats as having shorter time horizons and lower degrees of risk aversion, relative to democratic leaders (who reflect the median voter), and argues that this compels democracies to make deeper IEA commitments to reducing ozone depleting substances (102). In line with this theory, he finds that democracies were more likely to sign onto the Montreal Protocol and the Vienna Convention during the late 1980s than were authoritarian states. Neumayer instead draws from existing information-freedoms and individual rights-based arguments of the domestic environmental 'superiority' of democracies (72, 103) to hypothesize that democratic citizens will be better able to express their international environmental preferences to policymakers, and finds that democracies accordingly exhibit higher levels of IEA commitment and IEA participation across a wide range of IEAs and IEA-commitment mechanisms (104). As further evidence for this latter argument, domestic civil society pressure—a decidedly democratic freedom—has

[1] See, e.g., (99, 100, 101) for treatments of global IEA provision as a public good.

also been shown to be a strong determinant of both IEA ratification (105, 106) and IEA compliance (22, 107).

Empirical studies have also confirmed that authoritarian regimes do generally ratify IEAs more *slowly* than democracies, although there is little consensus surrounding the political mechanisms that produce this divergence. For example, Fredriksson and Gaston (69, 108) find that countries with greater political freedoms and civil liberties are quicker to ratify the UNFCCC; while Neumayer (70) reports similar findings in a study of the Montreal Protocol, the Convention on Biological Diversity (CBD) and the Convention on International Trade in Endangered Species of Fauna and Flora (CITES). Analyzing a large sample of IEAs and country-years, Bernauer et al. similarly report that democracies are more likely to ratify global environmental treaties, which like (69, 104, 108), they attribute to democracies' higher levels of civil liberties, and the higher degree of international environmental policy pressure that these civil liberties facilitate (109). More recently, and using a dataset covering "153 countries and 268 global environmental treaties between 1973 and 2006" (110, 97), Bernauer, Böhmelt, and Koubi consistently find that 'democracy' leads to faster IEA ratification, though their findings also suggest that democratic institutions do not do so by fostering greater civil society participation, which contradicts many of the causal stories presented or summarized in, for example, (104, 105, 106) (and discussed above). Finally, researchers have also repeatedly confirmed that these timing patterns consistently hold for international climate change agreements in particular, which currently encompass one of the most salient issue-areas of international environmental politics. For instance, Von Stein reports that higher levels of democracy[1] lead to faster ratification of the Kyoto Protocol and of the UNFCCC itself (48), as do a number of other studies of the Kyoto Protocol specifically (112, 113, 114, 115). Thus, in general, one might conclude from these findings that autocracies typically ratify IEAs less frequently, and more slowly, than democracies, and that the former therefore have lower levels of demand, on average, for international environmental treaties, than do democratic states.

Yet, when one delves deeper into the actual cases of IEA participation, one finds many authoritarian countries that 'buck this trend,' and that significantly

[1] As measured by Polity (111).

outperform their democratic counterparts in their pursuit of IEAs. Authoritarian Mexico, for example, was *the first* country to ratify the Montreal Protocol on Substances that Deplete the Ozone Layer, despite the fact that Mexico faced higher costs for reducing chlorofluorocarbons (CFCs) than did the United States (US) (116). Saudi Arabia and Jordan were likewise among the first five countries to ratify The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, an international treaty that explicitly regulates the wastes originating from several of these countries' primary industries, including those derived from the production of petroleum, fertilizers, pharmaceuticals, cement, and chemicals. Similarly, Robert Mugabe of Zimbabwe was one of the first five ratifiers of the UNFCCC, ratifying the convention just 7 months after its creation and months to years faster than, for instance, each and every European democracy. Lastly, China ratified the CBD—a treaty which potentially harmed profits for a variety of likely growth industries in China at that time, including pharmaceutical manufacturing, biotechnological, and food processing—only 8 months after its inception, and at a speed that exceeded 94% of all democratic ratifiers.

Evidence also suggests that such instances of international environmental activism by authoritarian governments extend well beyond the simple ratification of IEAs. In addition to Ethiopia's aforementioned "heroic" defense of IEAs at the 2002 World summit (6), the World Wildlife Fund (WWF)—a supporting-NGO to CITES[1]—has "recognized Cuba as the only country worldwide that is developing in an ecologically sustainable way" (118, 17), and other NGOs—along with CITES itself—have repeatedly commended China for its compliance efforts with CITES,[2] while Libya under Muammar Gaddafi was once recognized "as a world

[1]According to the WWF's own website, "WWF and TRAFFIC provide important scientific and technical support to CITES and work with member countries to implement legislation and regulations on CITES, and to ensure that those laws are effectively enforced" (117).

[2]For example, (i) "In recent years, China has stepped up monitoring and enforcement on ivory carvers and sellers, and its efforts were rewarded in July last year when the Convention on International Trade in Endangered Species (CITES) voted to allow Chinese buyers into the legal sale of stockpiled ivory that was about to begin in southern Africa" (119), (ii) "In a breakthrough, Chinese authorities inaugurated in 2001 the Hunchun Tiger-Leopard Reserve, 472 square miles of tiger habitat directly across the border. Chinese rangers removed 6,000 snares from the area" (120), and (iii) "Humane Society International called it a 'monumental decision' and a 'watershed moment for the global movement to protect sharks.' The conservation

pioneer in the field of combating desertification" (122, 371).[1] More recently, China has similarly complied with all of its formal Montreal Protocol obligations (124), and has taken a proactive stance within many other prominent IEAs (125, 126).[2] Contemporaneously, and working closely with the WWF (128, 129), the transnational Wildlife Conservation Society (129), and later with the the UN Education, Scientific, and Cultural Organization (UNESCO 130),[3] dictator Omar Bongo of Gabon recently set aside an "unprecedented" 10 percent of the country's total land mass for national parks,[4] in a move that has been described as setting "a new standard in African conservation" (129). Subsequently, Bongo went even further still, in pledging $2 million to cover UNESCO's 2011 budget shortfalls, which had arisen due to funding withdrawals "by the United States and Israel in protest at [UNESCO's] granting of membership to Palestine" (132).

More systematically, a comprehensive examination of authoritarian and democratic countries' IEA ratification behaviors vis-á-vis several of the most prominent global IEAs reveals that these counterintuitive patterns of IEA participation are not limited to the anecdotal authoritarian cases mentioned above. Figure 1.1a presents the number of months taken by countries to ratify the United Nations (UN) Convention on the Law of the Sea (LoTS) separately for democratic

group Shark Savers said it 'could be the best news for the oceans in some time.' The major development? The Chinese government announced Tuesday that it would ban the serving of shark fin soup, a prized and expensive delicacy, at official banquets" (121).

[1] A transnational environmental threat that has been described as"Africa's main environmental challenge" (123, 1).

[2] A stance also displayed by Vietnam (127).

[3] In addition to its broader (UN agency based) duties, UNESCO directly administers an international agreement that seeks to promote the preservation of areas of world culture and national heritage—with the latter area encompassing "Natural features consisting of physical and biological formations or groups of such formations, which are of outstanding universal value from the aesthetic or scientific point of view; Geological and physiographical formations and precisely delineated areas which constitute the habitat of threatened species of animals and plants of outstanding universal value from the point of view of science or conservation; [and] Natural sites or precisely delineated natural areas of outstanding universal value from the point of view of science, conservation or natural beauty." (Article 2, 131, 135). Ratifiers to this agreement are obligated to restore, protect, and maintain the natural state of these latter areas through a variety of national policy instruments and reporting mechanisms (Article 5, 131, 136).

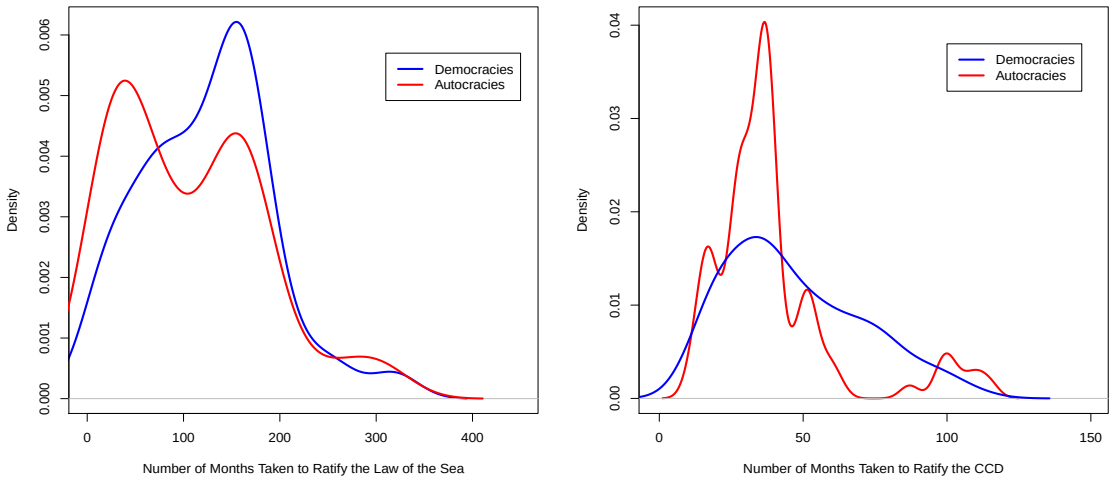
[4] Wherein, President Bongo stated that "[b]y creating these national parks, we will develop a viable alternative to simple exploitation of natural resources that will promote the preservation of our environment" (129).

country ratifiers (in blue) and autocratic country-ratifiers (in red),[1] via kernal density plots. The LoTS is an international treaty that encompasses several environmental and commercial aspects of international maritime cooperation, and specifically establishes regulations, enforcement rules, standards, and guidelines to prevent the pollution of the world's oceans and coastal areas due to "land-based and coastal activities; continental-shelf drilling; potential seabed mining; ocean dumping; vessel-source pollution; and pollution from or through the atmosphere" (133). In Figure 1.1a, one can observe that, although democracies ratified this convention en masse, there is a clear bimodal distribution of autocratic ratifiers, with one group of authoritarian states ratifying at a *faster* speed than most democracies and a second, slower group of autocracies ratifying at a comparable speed to that of the average democratic ratifier.

Figure 1.1b similarly presents the months taken by authoritarian and democratic countries to ratify the UN Convention to Combat Desertification (CCD), as of 2010. The CCD is a legally binding environmental treaty—with near global participation—that uses a series of guidelines, mechanisms, reporting-programs, and technology transfers to address local and transnational instances of drought, land degradation, and desertification within member countries (134, 135)—the latter problem often being referred to as "Africa's main environmental challenge" (123, 1). As above, Figure 1.1b indicates that most autocracies ratify this convention as quickly as, if not more quickly than, democracies, while a second, smaller group of autocracies (centered around the 100 month mark) ratify the CCD much less promptly than the aforementioned majority of democratic and autocratic CCD ratifiers. The findings reported here and above accordingly challenge our conventional wisdom of the IEA ratification behaviors of democratic and authoritarian states in two manners. First, it is clearly not the case that

[1] As of December, 2010. In this Figure, as well as in the density plots discussed further below, a country was classified as a democracy or autocracy based on the binary democracy-autocracy classification scheme develed by (7). The year-month that a given IEA was opened for ratification, or the year-month that a country gained independence, was used as the start date for evaluating a country's IEA ratification timing for Figure 1.1a as well as for the other figures reported in Chapter 1. Lastly, non-ratifying countries were dropped from the sample before calculating the densities reported in Figures 1.1-1.3, though the main insights discussed below hold when non-ratifiers are instead included in each density plots (based on the number of months that a country has spent, as of December 2010, without ratifying the IEA).

democracies categorically outperform autocracies in their pursuit of IEAs, as within both the CCD and LoTS, many autocracies chose to ratify these treaties at faster speeds than the average democracy. Second, authoritarian regimes, via their bimodal (ratification-rate) densities, also exhibit significantly *more variation* in their ratification practices than do democratic states[1]—with the former (i.e., authoritarian country) variation suggesting a pattern that has not yet been addressed within the IEA-ratification literature.



(a) Law of the Sea **(b)** Convention to Combat Desertification

Figure 1.1: Density Plots of Ratification Rates (LoTS and CCD)

While the ratification experiences of countries under the LoTS and CCD are informative, it is highly unlikely that the relatively faster (or comparable) autocratic-country ratification rates for these two particular treaties are generalizable to all major IEAs. Indeed, as noted above, a large number of empirical studies have consistently found—across a wide range of IEAs—that democracies ratify IEAs more quickly than autocratic states (48, 69, 104, 108, 109, 110, 115). However, even among global IEAs that experience faster democratic-country ratification rates, authoritarian countries continue to exhibit significantly more variation in their timings and strategies of IEA ratification, relative to democratic states.

[1]Whom instead tend to ratify these IEAs as a single group.

Figure 1.2a reports the number of months[1] taken by democratic and autocratic country-ratifiers to ratify the Convention on Migratory Species of Wild Animals (CMS),[2] an intergovernmental treaty that—through legally binding agreements, private sector partnerships,[3] and memoranda of understanding (MoU)—strictly protects (endangered) migratory animal species, their habitats, and their migrations (137). As above, the observed authoritarian-country CMS ratification-rates differ from those of democracies in several manners. Most notably, Figure 1.2a demonstrates that while democratic countries ratify the CMS relatively quickly and uniformly, authoritarian country ratifiers choose instead to ratify the CMS in two distinct waves. Hereof, one authoritarian country-group appears to ratify the CMS at almost equal speed to that of democratic ratifiers (i.e., approximately 100 months out), while a second, near equally sized group of autocratic ratifiers waits roughly three times as long to ratify this very same convention (i.e., approximately 300 months out).

Correspondingly, Figure 1.2b compares density plots of the time taken[4] to ratify the Ramsar Convention[5] across authoritarian and democratic country ratifiers. The Ramsar Convention—named for the Iranian city of Ramsar where the convention was originally developed and adopted (at a meeting of concerned states hosted by the Iranian Department of the Environment)—is a global IEA whose primary goal is to "stem the progressive encroachment on and loss of wetlands now and in the future" (138). As was the case for the CMS densities reported above, democracies appear to ratify the Ramsar Convention more quickly than do authoritarian states. Notably in this regard, democratic countries' generally unimodal, right-skewed (ratification-speed) densities are nearly identical across the CMS and Ramsar Convention in both shape and temporal range. On the other hand, autocratic countries again exhibit more variation, relative to democratic ratifiers, in their timings of Ramsar Convention ratification, although the corresponding density is not as bimodal as the autocratic country densities previously

[1] As of December, 2010.

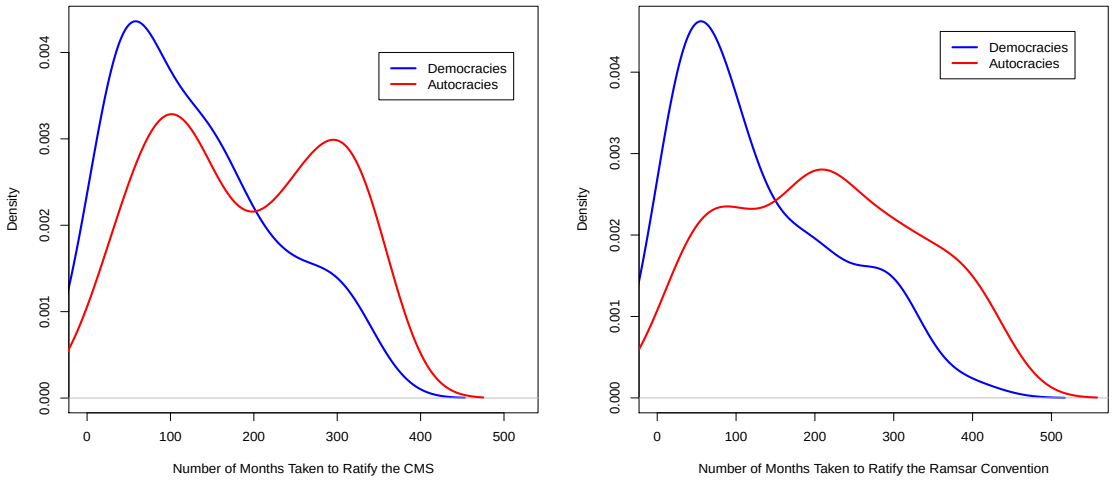
[2] The CMS is also known as the Bonn Convention.

[3] See, e.g., (136).

[4] In months, as of December 2010.

[5] The Ramsar Convention is also known as the Convention on Wetlands of International Importance, especially Waterfowl Habitat.

discussed. In particular, the mass of the autocratic country density in Figure 1.2b is moderately platykurtic, relatively symmetric, and extends roughly 100 months beyond the comparable density for democratic ratifiers. Thus, compared to democratic IEA ratifiers, authoritarian countries again display considerably higher variation in their time taken to ratify an IEA, no matter whether democracies or autocracies ratify a given IEA more quickly as a whole.



(a) Convention on Migratory Species **(b)** Ramsar Convention

Figure 1.2: Density Plots of Ratification Rates (CMS and Ramsar)

Finally, similar patterns emerge within even the most prominent of IEAs, such as the Kyoto Protocol to the UNFCCC.[1] Established in 1997, the Kyoto Protocol seeks to explicitly limit greenhouse gas (GHG) emissions among developed countries, while (less explicitly) committing developing country-members "to adopt climate change mitigation policies and to report on the action they are taking" (139, 269). Densities of autocratic and democratic countries' ratification

[1]The same could also be said of the Montreal Protocol. Even prior to the Montreal Protocol's establishment of multilateral transfer funds for developing-member countries, over a dozen autocracies had ratified the agreement, including Cameroon, Egypt, Jordan, Malaysia, Mexico, Nigeria, Tunisia, and Uganda. Nevertheless, another decade then passed before many other autocracies decided to join the Protocol, and many have still not yet ratified all of the Protocol's key Amendments.

speeds for the Kyoto Protocol reveal, in Figure 1.3, that authoritarian governments again display more variation than democratic polities—although both sets of regime-types in this case exhibit bimodal densities in their Kyoto Protocol ratification-timings. For the case of democratic Kyoto Protocol ratifiers, there exists a group of very early ratifiers,[1] quickly followed by a mass-democratic ratification in mid 2002.[2] On the other hand, authoritarian countries are on average slower to initially ratify, but then ratify at a relatively constant rate throughout much of the life of the Protocol, yielding a moderately platykurtic, slightly bimodal density that is fairly similar in distributional form to the authoritarian-country ratification-speed density plot for the Ramsar Convention (discussed above). Therefore, as before, it appears that authoritarian countries are significantly more heterogenous in there demands for IEA membership than democratic states.

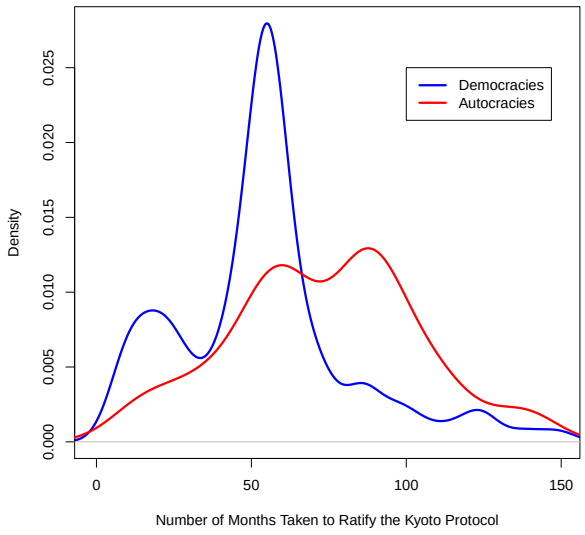


Figure 1.3: Density Plot of Ratification Rates (Kyoto Protocol) - For Democracies and Autocracies

[1]Corresponding primarily to the world's small island nations, along with some Latin American democracies.

[2]Which corresponds to European Union (EU) member countries' collective ratification of the Kyoto Protocol in May 2002, followed by an immediate wave of (developing and developed) democratic country ratifications during the lead up to the 2002 World Summit on Sustainable Development in Johannesburg.

All told, the insights from Figures 1.1-1.3—when viewed in conjunction with the country-IEA anecdotes discussed earlier—confound our existing understandings of (i) the environmental politics of authoritarian states and (ii) the demand for IEA membership among authoritarian regimes. It is clearly not the case that authoritarian countries categorically delay or neglect their IEA membership, as many authoritarian governments pursue these agreements as fast, if not faster than, democratic states. Moreover, given that many of the IEAs discussed above currently report near global participation levels, it is unlikely that this finding is arising solely because some subset of 'the worst' authoritarian regimes have *rejected* IEA participation altogether.[1] At the same time, it is also unlikely that these instances of speedy authoritarian IEA ratification can be fully explained by authoritarian countries' generally low anticipated costs of IEA compliance[2]—as such an explanation fails to account for the fact that there also exists *substantial variation* in authoritarian countries' actual ratification speeds.[3] Indeed, the IEAs presented in Figures 1.1-1.3 suggest that, while democratic ratifiers generally fit our theoretical expectations by collectively and expeditiously ratifying IEAs, we are wrong to think of authoritarian country ratifiers as a comparably uniform group. Rather, in a majority of the IEA cases presented above, there appears to be (at least) two distinct groups of authoritarian country ratifiers: a first group of autocrats seemingly ratify IEAs with unprecedented speed while a second group of autocratic regimes—more conforming to existing theoretical expectations—take significantly longer to ratify these very same agreements. What explains this counterintuitive variation? That is, why, given authoritarian countries' generally poor environmental records, do some authoritarian governments nevertheless

[1]Indeed, many notably despotic regimes, including North Korea, Myanmar, and Sudan have managed to ratify even the most prominent of IEAs, including the Vienna Convention and its Montreal Protocol, the UNFCCC and its Kyoto Protocol, and the CCD. Furthermore, as mentioned above, density plots were also created with non-ratifying countries included (based on the number of months that a non-ratifying country has spent, as of December 2010, without ratifying the IEA), and I find that their inclusion does not affect the main insights described above.

[2]Which could arguably arise because autocracies face lower domestic pressures (through either their lack of credible elections or these countries' more restrictive individual freedoms for domestic environmental interest groups) to follow through on their international (environmental) promises and commitments (58, 104, 105, 106, 107).

[3]In addition to its failing to account for the more systematic empirical findings of faster IEA Ratification by democratic states (48, 69, 104, 108, 109, 110, 115).

choose to participate in international environmental institutions at levels that greatly surpass other autocracies, and in some cases even democracies?

Answering this question is important. Explaining why, and when, authoritarian countries ratify IEAs will give researchers and policymakers a better understanding of the environmental preferences of authoritarian governments;[1] which comprise a subset of political regimes that—due to their restrictions on elections and individual freedoms—lack straightforward channels of domestic pro-environmental pressure.[2] Such an understanding is crucial for the future success of international environmental cooperation. A core implication of the "global commons" nature of international environmental problems (141) is that IEAs must achieve full (global or regional) participation in order to effectively solve the global (or regional) environmental issues that they seek to address (40, 574). Without such participation, concerns over free-riding, trade leakage, and the shifting of dirty industries to "pollution havens" in nonparticipating (authoritarian) countries will often preclude successful global environmental cooperation among even the most environmentally motivated states (100, 142, 143, 144, 145, 397-398).[3] Hence, IEA ratification by authoritarian governments is in many respects a necessary evil for successful environmental cooperation. Moreover, the minimum participation requirements and 'entry into force' clauses that are commonplace to IEAs simultaneously ensure that the *timing* of ratification by such governments is equally as important to an IEA's success. As von Stein notes in this regard, "Many of these agreements (including both the FCCC and the Kyoto Protocol) have substantial entry into force requirements. As a result, ratification delays in one state stall entry into force in other states" (48, 246). In fact, the Kyoto Protocol's entrance into force was ultimately (and singularly) dependent on its ratification by authoritarian Russia (150, 151),[4] whereas China's ratification

[1] And the sources of these preferences.

[2] Moreover, such findings will also have major implications for IEA *compliance*, as "understanding when and why states commit [to international agreements such as IEAs] can offer important insight into when and why they subsequently comply (140)" (48, 246).

[3] For more explicit discussion of how these factors have adversely affected international cooperation over ozone layer depletion and climate change, see (146) and (147, 148, 149), respectively.

[4] And moreover, as one policy outlet noted "the U.S. government used the absence of key developing countries as an excuse to justify its withdrawal from the Kyoto Protocol" (152).

of the Montreal Protocol is often characterized as being equally critical to the achievement of developing country participation in (and hence overall success of) this latter Protocol (153, 71).

The pivotal contributions of China and Russia to the past successes of the Montreal and Kyoto Protocols drive home a related point. Above and beyond the necessity of full (authoritarian country) participation to the achievement of global environmental cooperation, the consummation of many prominent areas of environmental cooperation—including those related to climate change—is becoming increasingly beholden to the timely IEA-participation of several key authoritarian countries. Indeed, as one scholarly account recently stated, "on a very practical level, China is absolutely central to the world's efforts to address climate change" (154, xi). Hence, explaining why environmental cooperation's most prominent authoritarian gate-keepers, including China, Russia, and the Group of 77 (G77) bargaining bloc,[1] agree to join and participate in IEAs (or not) is paramount to the future success of climate change cooperation—and to advancements in many other areas of environmental cooperation.[2] Answering the question presented above will help us to do so. Finally, identifying the causal mechanisms that underlie the observed deviations in authoritarian countries' rates of IEA participation may also contribute to our broader understandings of authoritarian governments' participation in *other areas* of international cooperation. In both their institutional design and underlying problem structure, there are a great many similarities between IEAs and other areas of international cooperation (20, 29, 32, 158, 159), and often, cross agreement linkages ensure that cooperation in the former is explicitly conditional on cooperation in the latter, and vice-versa (39, 100, 160, 161). Hence, explaining patterns of IEA participation by authoritarian regimes may provide us with a better understanding of the strategies and incentives of authoritarian country participation in other types of

[1] A group of developing countries whose membership includes nearly all authoritarian countries of the world (a major exception being the Soviet and post Soviet states of Eastern Europe and Central Asia). Notably, and depending on the year, authoritarian countries encompass a majority of all G77 member countries—as based upon the binary autocracy-democracy classification scheme developed by (7).

[2] Including, e.g., deforestation (155), biodiversity conservation (156, 91), desertification and sustainable development (157).

international agreements, including those relating to human rights, free trade, and international security.

1.3 Summary

To answer the questions posited above, this dissertation will focus exclusively on *within autocracy* variation to understand why some autocracies have chosen to ratify IEAs quickly while others have not. There already exists an abundance of empirical and theoretical research comparing the IEA ratification behaviors of autocracies to democracies, and such studies consistently find that autocracies are slower to ratify IEAs than are democratic governments (48, 69, 104, 108, 109, 110, 115). What is puzzling to me, however, is that while the IEA ratification behaviors of most democracies (and some autocracies) are consistent with these extant findings, a closer examination of several individual IEAs and authoritarian states (presented above) reveals that a considerable number of authoritarian regimes dramatically differ from other autocratic states (and from theoretical expectations more generally), in that they *vigorously* pursue IEA membership. Hence, I seek to understand why there exists differences *within* authoritarian states with regards to IEA ratification, which is a puzzle that cannot be solved by merely comparing authoritarian countries—in the aggregate—to democratic states. By examining institutional variation across and within autocracies—and the subsequent policy outcomes that this variation produces—in this manner, my research design is consistent with a number of emerging studies that exploit autocratic institutional variation to explain (international) political outcomes such as human rights treaty ratification (53, 162), domestic environmental quality (163), foreign aid and democratization (164) economic growth and investment (165, 166, 167), inter and intrastate conflict (168, 169, 170), and currency crises (171).

To begin to explain the observed variation in authoritarian countries' IEA ratification rates, I develop a formal theory that conceives of IEA ratification as the result of a strategic interaction between authoritarian governments and influential domestic groups. Specifically, I formally model an authoritarian country's IEA (non)ratification choice as being the outcome of a bargaining process between an autocrat—who favors ratification for material, policy, or reputational

benefits—and domestic "brown" industry owners—who oppose ratification due to the IEA's potential regulatory costs. In the model, the autocrat can attempt to quell industry opposition by promising industry owners future compensation to offset any anticipated costs. This promised compensation may come in the form of clandestine commitments to IEA nonenforcement, assurances of state financial assistance for IEA implementation, or promises to not capture industry-destined international aid. The model assumes, however, that an autocrat's willingness to follow through on these promises is private information to the autocrat alone, which gives industry owners pause, as (i) many authoritarian leaders lack the domestic institutional constraints needed for keeping long term commitments and (ii) future exogenous shocks—to *both* autocratic revenue streams *and* domestic IEA-enforcement incentives (via, e.g, third-party naming and shaming)—are likely. Using a one-sided incomplete information signaling model, I then examine the consequences of these dynamics within weakly and highly constitutionally constrained authoritarian regimes.

I find that in equilibrium, IEA-ratification by weakly constrained autocrats with high industry dependence serves as a credible commitment to providing compensation to brown industries post-ratification, which induces industry owners to cut back on their opposition to the IEA and to the autocrat. Recognizing this, it becomes rational for weakly constitutionally constrained authoritarian regimes to quickly ratify IEAs, and for industries to acquiesce to this decision. Immediate IEA ratification thereby serves to tie weakly constrained autocrats' hands, and signals to industry owners that autocratic commitments-to-compensation are credible. Hence, as a weakly constrained autocrat's dependence upon brown industry increases, it will have stronger incentives to immediately ratify an IEA, rather than delaying ratification until future periods. Interestingly, this finding implies that some autocrats opportunistically use international institutions to make credible commitments to domestic actors when they (i.e. autocrats) lack domestic commitment mechanisms. In essence, these dynamics arise because while IEAs do not systematically impose costs on all members for all IEA violations, they can ensure that member states incur costs when they renege on specific IEA-related commitments to domestic (brown) industries. This guarantees that—when undertaken in conjunction with an autocrat's promises of compensation to

industry owners—immediate IEA ratification will serve as a costly signal of these commitments for weakly constrained autocracies with high industry dependence.

On the other hand, the model also suggests that highly constitutionally constrained autocracies do not need to credibly commit to aid-provision *via* immediate IEA-ratification, giving these leaders—and industry owners—the incentives to delay the ratification of these agreements. Here, high constitutional constraints reveal, albeit imperfectly, information to brown industry owners that the autocrat has greater (domestic) political incentives to follow through on its promise and provide compensation to owners. This screening mechanism thereby reduces the incentives for constrained autocrats to incur the transaction costs associated with immediate IEA-ratification and provides a viable alternative for making credible promises to industry owners. These features, together with the heightened IEA-ratification costs that arise as industry size (via compensation allotments) and constitutional constraints expand, work to ensure that highly constrained autocrats will become less likely to expeditiously ratify IEAs as their industry dependence increases. In sum then, the formal model that I develop below implies that we should expect to see a divergence in autocracies' IEA ratification speeds, wherein industry dependence compels faster IEA ratification within weakly constitutionally constrained authoritarian regimes, but leads to delayed IEA ratification under constitutionally constrained autocracies.

As an additional implication of the formal model presented below (hereafter denoted as Proposition 3), I correspondingly find that weakly constitutionally constrained autocrats with high industry dependence will be able to *prolong* their survival in office—and curtail industry-spending to remove them from office—by ratifying IEAs. In the model, this specific implication arises because brown industry owners will choose to reduce the actual amount of capital that they spend to remove an IEA-ratifying autocrat from power *only* when such an autocrat credibly commitments to providing them (i.e. the owners) with cost-offsetting compensation, which, based on the unique separating equilibrium result, can only be achieved through immediate IEA-ratification *when* an autocrat faces low constitutional constraints and high industry dependence. Importantly, and in line with extant accounts of industry owners' various channels of political-economic influence upon authoritarian stability (172, 173, 174, 175, 176, 367), this reduced

likelihood of authoritarian removal will pertain to *any* form of authoritarian government removal,[1] not only to violent removal. Therefore, put succinctly, this third and final proposition thereby suggests that as brown industry dependence increases and constitutional constraints decrease, IEA-ratification should (i) reduce the likelihood of industry mobilization against autocracies and (ii) increase the probability of authoritarian regime-survival.[2]

Altogether, the formal model that I develop below accordingly yields three testable propositions of authoritarian governments' IEA ratification behaviors, and of their subsequent probabilities of survival. To test the first two propositions—which relate to authoritarian countries' timings of IEA ratification—I construct a novel treaty-ratification data set that measures authoritarian IEA-ratification patterns at the *monthly* level for 15 key IEAs during the years 1972-2010.[3] Using a variety of hazard (i.e., survival) models, I then examine the effects of an interaction between constitutional constraints (111) and brown-industry dependence as a share of GDP (178) on the time taken by authoritarian countries (in months) to ratify each of these 15 IEAs. This survival analysis indicates that constitutionally unconstrained authoritarian regimes with high industry dependence do indeed ratify IEAs much more quickly than unconstrained authoritarian regimes with low levels of industry dependence. The analysis also demonstrates that industry dependence has the opposite effect in highly constrained authoritarian regimes: higher levels of industry dependence lead to slower rates of ratification among these autocracies. In support of the first two predictions derived from my formal signaling model (summarized above), these results imply that authoritarian regimes with high levels of industry dependence and low levels of constitutional constraints will often seek-out IEAs to tie their hands and credibly signal to domestic industry owners that they (i.e. the autocrats) are committed to providing compensation; whereas authoritarian regimes with high constitutional constraints will instead respond to higher industry dependence with delays

[1]Including the nonviolent replacement of an authoritarian leader by his own party, as was the case recently in Malaysia (177), or even peaceful transitions to democracy.

[2]Moreover, the formal model presented below in turn suggests that these dynamics will provide further incentives for unconstrained authoritarian regimes to hastily ratify IEAs as their dependence on brown industry increases.

[3]The 15 IEAs included in my sample are listed in Table 3.1.

in IEA ratification.

I set about testing Proposition 3—which contends that IEA ratification will decrease the likelihood of regime-failure among unconstrained autocracies as industry dependence increases—by building upon the monthly IEA ratification data set described above. I complement these data with a novel monthly indicator of authoritarian regime failure, measured for all autocracies of the world during the years 1972-2010. To create this monthly regime-failure measure, which I use as the primary dependent variable in my tests of Proposition 3, I specifically recode Geddes, Wright and Frantz' newly available (annual) authoritarian regime failure data (179)—along with a number of additional authoritarian regimes—to the monthly level, for my years of interest, through the use of a variety of academic sources (e.g., 180, 181, 182, 183, 184). In examining the duration of authoritarian regimes (in months) with these data, I am thereby able to assess the effect(s) of IEA-membership on authoritarian regime survival among constitutionally constrained and constitutionally unconstrained regimes—for varying levels of industry dependence. Due however to authoritarian countries' varied incentives to (hastily) ratify and join into IEAs, this approach presented a number of challenges relating to selection effects that had to be addressed. To do so, I employ variety of seemingly unrelated discrete-choice models in my tests of Proposition 3 so as to account for the non-random selection of autocracies into IEAs[1] when evaluating the effects of IEA-membership on authoritarian regime-survival. The results from this analysis indicate that, even after accounting for authoritarian countries' heterogenous incentives to join IEAs, IEA-membership does in fact (uniquely) increase the probability of authoritarian survival among unconstrained autocracies with high levels of industry dependence, which is consistent with Proposition 3. Hence, high industry dependence not only compels unconstrained autocracies to ratify IEAs more quickly, but also enhances the probability of survival for these regimes, ex-post to IEA-ratification.

The signaling model of authoritarian IEA-participation presented below, together with my empirical tests of its core propositions, thereby provide a convincing answer to the question posited earlier, which asked: why do some authoritar-

[1]Which my signaling model suggests may itself be influenced by authoritarian countries' anticipated probabilities of regime survival.

ian governments choose to vigorously participate in international environmental institutions, while many others do not? Indeed, the evidence presented in this dissertation suggests that we observe this surprising variation because authoritarian governments have divergent domestic incentives for using IEAs, via their ratifications, as domestic hands-tying mechanisms. Specifically, my theory and findings imply that we observe expedited rates of authoritarian IEA-ratification among weakly constitutionally constrained autocracies because ratification allows this particular subset of authoritarian regimes to credibly signal their commitments to provide cost-offsetting compensation to domestic industry owners. As mentioned above, I also find empirical support for a key political implication of this signaling strategy: IEA ratification by unconstrained authoritarian regimes, in-turn, compels industry owners to reduce the amount of capital they spend to oppose the regime, thereby enhancing the probabilities of regime-survival.

These findings have several important implications for our understandings of authoritarian regimes, international institutions, and environmental politics. Regarding the comparative study authoritarian regimes, my results suggest that we are often wrong to imagine even the least constrained authoritarian regimes as lacking the ability to make credible commitments to domestic audiences and industries, as institutionally unconstrained authoritarian regimes appear to have both the capabilities and the incentives to use international institutions to make credible commitments of these sorts, even in the absence of domestic commitment mechanisms. This finding, in turn, has accordingly identified a new dimension to the interactive qualities of international institutions and domestic political institutions, which is an important and emerging area of inquiry within both (i) international institutions research (17, 30, 749) and (ii) the study of authoritarian regimes' foreign policy decisions (53, 162, 168, 169, 171). In establishing a robust linkage between domestic authoritarian institutions and authoritarian countries' incentives for IEA membership, I have also helped to explain the puzzling variation in authoritarian country IEA ratification patterns that was presented at the outset of this introduction: *some* authoritarian regimes ratify IEAs at a significantly faster speed than other autocratic ratifiers—and at a speed that is largely comparable to democratic ratifiers—because doing so allows *some* autocracies to make credible promises to powerful domestic interest groups, and to thus prolong

their prospects of survival in office. It is hoped that these insights will accordingly compel the future designers of environmental treaties to better account for (i) authoritarian countries' (perhaps perverse) incentives to ratify these agreements and (ii) the consequences of international treaty design for the persistence of authoritarian rule across the globe.

Building upon this latter point, my findings have also helped to redefine how we interpret (i) the environmental policies of authoritarian regimes and (ii) the broader consequences of these policies for what has come to be known as the global "race to the bottom" in environmental standards. In particular, the implied positive relationship between brown industry dependence and IEA-membership in unconstrained autocracies—established below—challenges conventional understandings of the pollution haven and "race to the bottom" hypotheses, which each posit, in part, that declining trade barriers will enable pollution-intensive industries to relocate to countries with less stringent environmental regulation—thereby given heavily industry dependent states a disincentive for stringent environmental regulation. However, the identified positive relationship between IEA-membership and brown industry dependence among unconstrained autocracies instead suggests that *more* international environmental regulation will at times induce *more* domestic industry satisfaction—which is opposite to what pollution haven theories would expect. Thus, two key policy implications of this dissertation are that—contra to the pollution haven hypothesis—(i) environmental regulation may at times help (authoritarian) governments to appease and reassure their domestic brown industries, rather than compelling such industries to abscond and (ii) higher levels of brown industry dependence need not necessarily lead to lower levels of (de jure) environmental regulation. Finally, it is hoped that, in crafting a formal theory that treats authoritarian countries' foreign policy decisions as a bargaining outcome between autocrats and industry owners, this dissertation has also helped to develop a theoretical template for the future analysis of similar (industry influenced) authoritarian foreign policy decisions, such as those relating to IMF program participation, RTA and bilateral investment treaty (BIT) membership, regional integration and currency unions, and international loan repayments.

1.4 Road-Map

The ensuing chapters of this dissertation are organized as follows. Chapter 2 presents a formal signaling model of IEA participation by authoritarian countries, and derives a set of testable propositions relating to (i) IEA ratification and (ii) authoritarian regime survival (which I discuss in detail above and below). Chapter 3 employs an authoritarian country IEA ratification data set, along with a series of survival models, to empirically test my expectations regarding the timing of IEA ratification by authoritarian regimes. Building on this analysis, Chapter 4 then utilizes a series of seemingly unrelated discrete choice models, supplemented with additional robustness tests, to empirically evaluate my third and final testable proposition, which suggested that under some contexts authoritarian countries would be more likely to survive in office as a result of their (timely) IEA membership decisions. Additionally, the appendix to Chapter 4 presents a detailed summary of my monthly codings of authoritarian regime failures, as it is hoped that these monthly records will themselves be a contribution to the study of authoritarian governments. Chapter 5 concludes with a discussion of the implications of my findings for the study of environmental politics, authoritarian regimes, and international cooperation—in addition to highlighting several potential avenues of future research.

2

A Signaling Model of Environmental Treaty Ratification and Authoritarian Survival

2.1 Introduction

This chapter develops a signaling model to explain why international environmental agreements (IEAs) are ratified quickly by some authoritarian regimes, but not others. Specifically, I model the decision to ratify an IEA as an outcome of strategic interaction between authoritarian governments and domestic "brown" industries. IEA-ratification provides authoritarian leaders with political-economic benefits,[1] but imposes costs upon brown industries by forcing these industries to become more "green." These costs compel industry owners to oppose IEA-ratification and to threaten to depose of authoritarian leaders if an IEA is nevertheless ratified.

When these threats are credible—as is the case for heavily industry-dependent authoritarian countries—autocrats have two options: (i) they can acquiesce to industry-demands and not ratify the IEA, or (ii) they can attempt to assuage

[1]Such as monetary-side payments, reputational benefits, or preferential treatment within other international regimes and issue areas (100, 185).

industry concerns with promises to provide them (i.e. the industry owners) with cost-offsetting compensation, ex-post to IEA-ratification. As argued below, this promised compensation may come in the form of clandestine commitments to IEA nonenforcement by the autocrat, assurances of state financial assistance for IEA implementation (e.g., preferential tax treatment, regulatory treatment, or financial incentives), or promises to not capture industry-directed international aid (from, e.g., the IEA's funding mechanisms or third party donors).

However, it is difficult for autocrats—and particularly weakly constitutionally constrained autocrats—to credibly commit to providing these sorts of cost-offsetting compensation to industries, ex-ante. Indeed, industry leaders have good reason to be wary of these authoritarian aid-promises as (i) many authoritarian leaders lack the domestic institutional constraints needed for keeping long term commitments and (ii) future exogenous shocks—to both autocratic revenue streams and domestic IEA-enforcement incentives (via, e.g, third-party naming and shaming)—are likely. Regarding the former, for instance, it has been widely noted[1] that autocrats often have powerful incentives to renege on past commitments to business and industry; especially when doing so (i) captures private goods or rents for the autocrat and (ii) isn't constrained by domestic institutions or laws. Recognizing this, industry owners will be uncertain about the credibility of an authoritarian leader's compensation promise (ex-ante to IEA-ratification), though—as argued below—they will be able to infer that weak *constitutional constraints* likely map onto weak compensation-commitment credibility. This incomplete information creates a strategic bargaining problem for industry owners and authoritarian leaders as these two sides seek to reach an agreement over IEA-ratification and the autocrat's subsequent levels of compensation provision (if any).

The one-sided incomplete information signaling model that I present below examines the consequences of these dynamics among weakly and highly constitutionally constrained authoritarian regimes—when faced with varying levels of industry dependence. To foreshadow, I find that in equilibrium, IEA-ratification by weakly constrained autocrats with high industry dependence serves as a credible commitment to provide compensation post ratification, which induces in-

[1]See, e.g., (165, 166, 167, 186, 187).

dustry owners to cut back on their opposition to the IEA and to the autocrat. Recognizing this, it becomes rational for weakly constitutionally constrained authoritarian regimes to quickly ratify IEAs, and for industries to acquiesce to this decision. Immediate IEA ratification thereby serves to tie weakly constrained autocrats' hands, and signals to industry owners that autocratic commitments-to-compensation are credible. Hence as a weakly constrained autocrat's dependence upon brown industry increases, it will have stronger incentives to immediately ratify an IEA, rather than delaying ratification until future periods. In essence, these dynamics arise because while IEAs do not systematically impose costs on all members for all IEA violations, they can ensure that member states incur costs when they renege on specific IEA-related commitments to domestic (brown) industries. This guarantees that—when undertaken in conjunction with an autocrat's promises of compensation to industry owners—immediate IEA ratification will serve as a costly signal of these commitments within weakly constrained autocracies with high industry dependence.

On the other hand, the model also suggests that highly constitutionally constrained autocracies do not need to credibly commit to aid-provision *via* immediate IEA-ratification, giving these leaders—and industry owners—the incentives to delay the ratification of these agreements. Here, high constitutional constraints reveal, albeit imperfectly, information to brown industry owners that the autocrat has greater (domestic) political incentives to follow through on its promise and provide compensation to owners. This screening mechanism thereby reduces the incentives for constrained autocrats to incur the transaction costs associated with immediate IEA-ratification and provides a viable alternative to make credible promises to industry owners. These features, together with the heightened IEA-ratification costs that arise as industry size (via compensation allotments) and constitutional constraints expand, work to ensure that highly constrained autocrats will become less likely to expeditiously ratify IEAs as their industry dependence increases.

The signaling model presented below offers three key results. First, the model predicts that weakly constitutionally constrained autocrats that face powerful industry demands will be more likely to successfully and quickly resolve their strategic problems with industry owners, leading to faster IEA-ratification. Conversely,

the model also implies that the opposite should hold true for constrained autocracies: more industry dependence should delay, not expedite, IEA-ratification. Together, these two findings suggest that increases in industry dependence will have divergent effects on IEA ratification among unconstrained and constrained authoritarian regimes: hastening ratification in the former and stalling ratification in the latter. Finally, the model predicts that weakly constitutionally constrained autocrats with high industry dependence can in fact prolong their survival in office—and curtail industry-spending to remove them from office—by ratifying IEAs. Under conditions of low constitutional constraints, this latter prediction thereby suggests that IEA-ratification should lead us to be less likely to observe (i) industry mobilization against autocracies and (ii) the breakdown of authoritarian regimes; as industry dependence increases.

2.2 The Model

2.2.1 Background

This section constructs an incomplete-information game-theoretic model that analyzes the ratification of an IEA as the outcome of interaction between an autocratic government A and the owners of domestic brown industries N. Immediately below, I provide a brief background of the underlying strategic dynamics that arise between the players mentioned above before proceeding to describing their utility functions. A complete table of the key terms and notation used in the model appears in the appendix (Table 2.1).

I begin by assuming that an autocratic government can obtain (as described below) some realized positive payoffs *if* it ratifies an IEA. However, the owners of brown industries—characterized as β: the total industry-output produced as a share of the autocratic country's GDP—have incentives to oppose IEA-ratification, as the IEA includes provisions that require brown industries to cur-

tail production[1] which in turn adversely affects their revenue.[2] Evidence suggests that IEAs do impose such costs upon industries in authoritarian states. For example, as the result of recent (IEA-compelled) environmental regulations, the Vietnamese government "has begun using economic instruments to internalize costs of environmental protection into industry" (192, 256), while similarly, "the Chinese government has used climate and environmental goals to justify its decisions to shut down old and inefficient facilities" within the steel, iron, utilities, petrochemicals, and construction materials sectors (193, 455).[3] In such instances, extant literature finds that industries in authoritarian regimes do routinely oppose pollution regulation and, in turn, use their bargaining power to resist this regulation (196). In the model, a "political contest" over the issue of IEA-ratification therefore emerges between the brown industry owners and the autocratic government in which the owners put pressure on A to not ratify the IEA. Following existing formal models of political contest between autocrats and domestic groups (including industry owners),[4] the owners specifically put political pressure on A by spending βk—where k denotes some share of their capital—to threaten to remove the government from office.[5] It is assumed without loss of generality that

[1]Major areas of IEA-regulation include deforestation, the waste trade, natural resource extraction and consumption, and chemical production, each of which entails a non-negligible production cost for at least one major industry. Industry opposition to IEA ratification is well documented. For example, during the negotiation of the Cartagena Protocol, "industry actors strongly resisted strict regulation of the trade of GMOs, including genetically modified seeds and, in the end, advocated rules for the trade in GMOs that are weak and vague" (188, 2); while similar levels of industry opposition are reported in studies of the Kyoto Protocol (189), the Montreal Protocol (190, 5) and the Basel Convention (191, 531).

[2]Note that by construction $\beta \in [0, 1]$ since β is the total output produced by brown industries as a *share* of the autocratic country's GDP.

[3]For additional accounts of the Chinese government's enforcement of domestic and international pollution policies, see (194, 195, 41).

[4]See, e.g, (197) and (198).

[5]I thus assume here that industry owners will oppose their government by spending—or threatening to spend—capital to remove a government from office, as opposed to seeking to replace a leader via elections. I believe that this assumption is defensible given the lack of credible elections in authoritarian regimes (and hence extending the theory presented below to democratic settings would necessitate the inclusion of an election mechanism into the formal model). In practice, industry owners may spend (or sacrifice) capital to support opposition parties, to damage the national economy (and an autocrat's revenue streams), or to fund the actual violent removal of an autocratic leader. There is ample evidence to support these assertions (in authoritarian settings). For instance, country case studies indicate that industries have been shown to support coup d'états and coordinate major strikes in efforts to drain autocrats of re-

k is linear with respect to β, as greater output (β) produced by brown industries will generate more capital k for these industries.[1]

The autocratic government recognizes that brown industry owners oppose IEA-ratification and also observes βk which is a threat to its power. Since A may obtain payoffs if it successfully ratifies the IEA, it promises the owners ex-ante that it will provide them with cost-offsetting compensation (g) ex-post to ratification. In essence, this compensation-commitment is intended to curtail industry owners' opposition to IEA-ratification (and thus to the autocrat itself) and can come in several forms. Perhaps most commonly, an autocrat may promise industry owners that it will not enforce any treaty obligations bestowed upon domestic industries—in effect "looking the other way". Alternatively, the autocrat can commit itself to the distribution of capital or technological assistance to IEA-affected industries. These latter commitments may entail direct transfers from the autocrat to industry—in the form of preferential tax treatment, regulatory treatment, financial incentives—or transfers from third parties such as IEAs and international NGOs, in which case the autocrat's promise amounts to a guarantee to not capture or predate upon this international assistance.

Anecdotal evidence supports these claims. Regarding promises of non-enforcement, the Wall Street Journal recently reported that in China "more than 30 environmental and other officials from the Nantong area were implicated in a scandal that involves bribery and turning a blind eye to pollution problems...it's now fairly clear that Nantong environmental officials were running something closer to an environmental protection racket" (203). Similar reports have surfaced of the Pakistani government turning a blind eye to the illegal import and use of CFCs by domestic businesses—in violation of the Montreal Protocol—in 2004 (204), and of Russian and Turkmen politicians "shunning" compliance with international environmental treaties in favor of domestic job creation in 1992 (205).

Autocrats also frequently offer (future) financial assistance to IEA-affected industries. After establishing voluntary climate-change mitigation targets for en-

sources (175, e.g.,), to more generally oppose autocratic governments via opposition spending and interest group lobbying (199, 200, 225, 244-252), and to encourage democratization through their financial (and direct) support of opposition and pro-democracy parties (201, 202, Ch. 5).

[1]This implies that $\frac{dk}{d\beta} > 0$ or, in other words, $k_\beta > 0$. The equilibrium and comparative static results do not alter if I drop the assumption that $k_\beta > 0$.

ergy intensity—largely in response to negotiations within the Kyoto Protocol and UNFCCC—China promised key industry leaders "national support through a number of preferential tax, finance and fiscal incentives as well as preferential access to public procurement" (206, 14), where specifically, "a 0.25 yuan per kilowatt hour subsidy for renewable energy production was set by the law for the first fifteen years of a facility's operation" (193, 453). Mexico adopted a similar approach in the 1970s; promising industries tax incentives to offset the costs of domestic antipollution controls (207, 13). Statements made by authoritarian politicians likewise suggest that many autocracies value IEA-mechanisms that "promise" international funding and technology transfers to domestic industries. During recent high level climate change negotiations within the Kyoto Protocol and UNFCCC, a Tanzanian cabinet minister stressed that Tanzania was "willing to participate in such greener sustainable development paths provided technologies, finance and capacities are predictably and sustainably availed in order to stimulate such actions in the various sectors of the economy" (208, 4-5), as did representatives from Vietnam.[1] Similarly, China's top climate change negotiator recently stated that "Beijing would consider limits on its worst polluting industries if rich nations handed over the technology to help clean them up" (210).

Taken together, autocrats thereby possess, and use, a variety of tools for making assurances to IEA-affected domestic industries. As argued below, these promises of offsetting compensation (g) are together made by A to garner the owner's support for IEA ratification and prolong its probability of survival $p(g, \beta k)$ in office. Note, however, that the autocratic government's "willingness" to provide compensation—denoted as λ—is the government's own private information.[2] In the model, the value of λ is randomly drawn by Nature from a uniform distribution, $\lambda \in \tilde{U}[0, 1]$,[3] and λ is accordingly observed by the government but not by the owners. Because the owners do not observe λ, they are therefore uncertain about the credibility of the government's promise to compensate them with g *ex-post*, and I analyze formally below how this uncertainty affects the domestic

[1] "It is imperative and urgent that developed country Parties provide developing countries with scaled-up, adequate and predictable, new and additional funding, as well as technology transfer and capacity building in accordance with the Bali Action Plan."(209, 2).

[2] λ can also be conceptualized as A's "type".

[3] This uniform distribution is common knowledge the players.

politics of IEA-ratification in the autocratic regime in the context of (i) β and (ii) the degree of de facto constitutional constraints $c \in [0, 1]$ that A faces in the process of attempting to ratify the IEA.

In practice, industry owners have good reason to be wary of autocratic commitments-to-compensation, given (i) autocrats' generally low levels of domestic institutional constraints (and the adverse effects that this has on credible commitments) and (ii) the propensity for future exogenous shocks to autocratic revenue streams and domestic IEA-enforcement incentives.[1] I accept the latter as a 'constant uncertainty' underlying all IEAs and model the former explicitly via an autocrat's level of constitutional constraints (c). The justification for examining constitutional constrains as the central moderator in the relationship between industry dependence and IEA-ratification is as follows. As shown formally below, the political contest analyzed in this chapter rests on an autocrat's (in)ability to credibly promise compensation to industry owners in future periods. Extant theory suggests that—due to either their short time horizons or narrow selectorates—autocrats will have difficultly in keeping these promises (215, 216), and industries will likely recognize this deficiency (186, 217, 218, 219). Authoritarian leaders, already lacking regularized elections, must then turn to other mechanisms (and institutions) to enhance the credibility of their commitments.

While a number of domestic institutions have recently been advanced as beneficial to this end,[2] constitutional constraints cut directly to the heart of this matter for two key reasons. First, constitutional constraints, as defined here,

[1]Shocks to IEA enforcement incentives can arise through several channels. Often, naming and shaming (by international NGOs, other IEA members, or the IEAs themselves) compels autocrats to increase their IEA enforcement. E.g., after reports of IEA violations by various international NGOs and media outlets, Vietnam and South Africa each individually initiated crackdowns on domestic actors participating in the illegal wildlife trade (211, 212), while Cambodia and Cameroon each responded by cracking down on illegal logging (213, 214). IEAs also frequently evolve over time to (i) mandate more extensive regulations among (autocratic) member countries and (ii) increase the incentives for countries to enforce these heightened regulations. The Montreal Protocol, for instance, has seen extensive adjustments and amendments during the agreement's lifespan for (i) faster phase-out periods for various chemicals and (ii) more stringent enforcement guidelines for developing country members (153).

[2]In this vein, Boix (220) and Wright (165) each show that authoritarian legislatures constrain autocratic leaders in political-economic settings. Similarly, Gehlbach and Keefer (166) argue and find that some authoritarian institutions—such as institutionalized ruling parties—enhance the ability of regime-members to make credible commitments.

represent the aggregate level of de-facto institutional control over the decision making powers of a country's chief executive(s) (111) and in doing so encompass many of the authoritarian institutions that are argued to affect authoritarian credibility (e.g., independent legislatures or judiciaries). It is most likely that industry owners, when assessing the credibility of authoritarian promises, will draw upon this aggregate in making their assessments, rather than any single institutional feature in isolation. In this regard, I therefore side with Aydin and Gates (221) in noting that "executive decision-making constraints constitute the key institutional dimension shaping rulers' incentives" (221, 8). Second, *de facto* constitutional constraints, as used here,[1] also capture how *credible* any existing institutional constraints are in actually constraining an autocrat; by identifying whether the authoritarian leader abides by constraints in practice as opposed to (e.g.,) regularly re-writing the constitution, dissolving the legislature, or ruling by decree. As above, this feature is critical to an autocrat's ability to promise compensation to industry, and hence constitutional constraints serve as the core institutional component in the political contest examined below.

2.2.2 Utility functions and Equilibrium Concept

The autocratic government in the model receives some finite amount of monetary benefits $\phi > 0$ provided that it survives in office with probability $p(g, \beta k)$ (this probability function is defined in detail below).[2] In office, the government A chooses whether or not to ratify the IEA in the short-run $r \in \{0, 1\}$. If it ratifies, then $r = 1$; if not, then $r = 0$. Ratification generates positive payoffs for A. IEAs—and instrumental member countries—consistently provide large sums of monetary inducements to developing countries for IEA-ratification. As Wagner (100) notes in this regard, monetary side payments form an integral part of such IEAs wherein "one can distinguish between direct bilateral payments as, for example, in the North Pacific Fur Seal Treaty, and indirect payments made via multilateral funds, like, for example, the Global Environmental Facility Maintained by the World Bank and the Multilateral Fund established in the 1990

[1] And by past research, e.g., (111, 221, 222, 223).

[2] For instance, $\phi > 0$ may include the stream of rents that A receives in office.

Amendments to the Montreal Protocol. In-kind transfers include direct investments, technical assistance and financial aid for projects controlled by the donor" (100, 394). As one example of such payoffs in action, Zhao (124) reports that Chinese participation in the Montreal Protocol was contingent on the allocation of multilateral transfer funds (of various forms). Autocratic countries may also receive preferential treatment within other international regimes and issue areas in return for IEA-ratification. For example it is widely regarded that the EU agreed to support Russian membership in the WTO in exchange for Russia's ratification of the Kyoto Protocol (151, 58-59), which, at the time, was not without its costs for Moscow.[1] Hence, IEA-Ratification can generate positive payoffs for A.

A's payoff from ratifying an IEA is therefore defined as $r\alpha$ which is equal to α when $r = 1$, and is 0 otherwise. A also incurs some costs when seeking to ratify the IEA. First, A incurs a cost by offering g (which is influenced by λ) to N to not only garner the owners' support for IEA-ratification but to also increase its probability of survival in power. Second, apart from g, it is also plausible that the degree of constitutional constraints $c \in [0, 1]$ that A faces when specifically ratifying the IEA can also impose transaction costs in the ratification process.[2] Hence, in the model, the government's ratification cost is assumed to be equal to $c\lambda g$ when $r = 1$, and is equal to λg (i.e. when $r = 0$).[3]

From the description in the preceding paragraph, A's utility function is thus defined by the benefits ϕ that it obtains from surviving in office with probability

[1]Prior to Russia's ratification of the Kyoto Protocol, "Andrei Illiarionov, the Kremlin's economic adviser, has predicted that emissions could be back to 1990 levels by 2008 -so breaching the Kyoto targets. He has given a warning that it would make impossible Putin's target of doubling gross domestic product in a decade. He has even said that attempts to impose the pact on Russia are colonial repression, and called it 'an international gulag' and a 'death treaty' for growth" (224).

[2]There are two ways in which higher constitutional constraints may raise the transaction costs of IEA ratification for autocrats. First, higher constraints have been shown to increase the influence of competing domestic factions in the treaty ratification process, whom a leader must then "buy-off" with side payments and domestic concessions in order to prevent the "factional blocking" of ratification (225). Second, constraints may also lead to slower treaty ratification (50), which could impose costs on autocrats through delays in IEA-benefits until future periods.

[3]This implies that A's expected ratification cost is equal to $[rc + (1 - r)]\lambda g$. Note that (i) A's marginal cost of providing g to the owners is $c\lambda$ if $r = 1$, and is λ if $r = 0$ and (ii) because A offers g, A can ensure that λg (i.e. A's ratification cost when $r = 0$) is zero.

$p(g, \beta k)$ and its choice of r and g:

$$u_A(g, \beta k, r; \lambda) = p(g, \beta k)\phi + r\alpha - [rc + (1 - r)]\lambda g$$

As mentioned earlier, a central political feature of the model is that the government promises to provide g to industry owners in order to garner industry support for IEA-ratification and prolong A's survival in power, while the owners spend βk to threaten to depose A from office. I thus assume from existing models of political contest in autocratic regimes[1] that the functional form of $p(g, \beta k)$ is given by: $p(g, \beta k) = \frac{g}{g+\beta k}$. This functional form for $p(g, \beta k)$ implies that $p_g > 0$ and $p_k < 0$ for $\beta > 0$ which formally captures the political feature described above.[2]

I next turn to define the utility function for the owners of brown industries. I posited earlier that brown industry owners spend βk to threaten to remove the government from office. If A fails to survive in power— which occurs with probability $[1 - p(g, \beta k)]$—because of the owners' anti-regime efforts, then the owners will obtain ϕ with probability $[1 - p(g, \beta k)]$ in the model. The owners' expected benefit from political contest is thus $[1 - p(g, \beta k)]\phi - \beta k$. In addition to this, the total profit that the owners obtain from production is given by π. The owners' utility function is therefore:

$$u_N(g, \beta k, r) = \pi + [1 - p(g, \beta k)]\phi - \beta k$$

The sequence of the game is as follows. First, Nature chooses λ from a uniform distribution, $\lambda \in \tilde{U}[0, 1]$. λ is observed by A but not by N. A then chooses its short-run ratification decision $r \in \{0, 1\}$ *and* promises to provide g to N. On observing r and g, N updates its beliefs about λ and chooses k; which is influenced by β. The government's choice of g and the owners choice of k affects $p(g, \beta k)$. All payoffs are realized and the game ends. Figure 2.1 illustrates the sequence of moves. I solve for the Perfect Bayesian Equilibrium (PBE) of the

[1] See, e.g, (197) and (198).

[2] More specifically, $p_g > 0$ (that is, $\frac{dp}{dg} > 0$) implies that A's probability of survival in power increases *if* it transfers g to the owners. $p_k < 0$ for $\beta > 0$ (i.e. $\frac{dp}{dk} < 0$ for $\beta > 0$) implies that As's probability of survival in power decreases *if* the owners increase the amount of capital spent on threatening to remove the government from power.

one-sided incomplete information signaling game described above. A PBE of this incomplete information game consists of a strategy profile and a set of beliefs such that (i) A chooses its strategy to maximize its utility subject to N's strategy; (ii) N chooses its strategy to maximize its utility subject to both A's strategy and to its beliefs conditional upon A's signal and (iii) N's beliefs are updated according to Bayes' rule whenever possible.

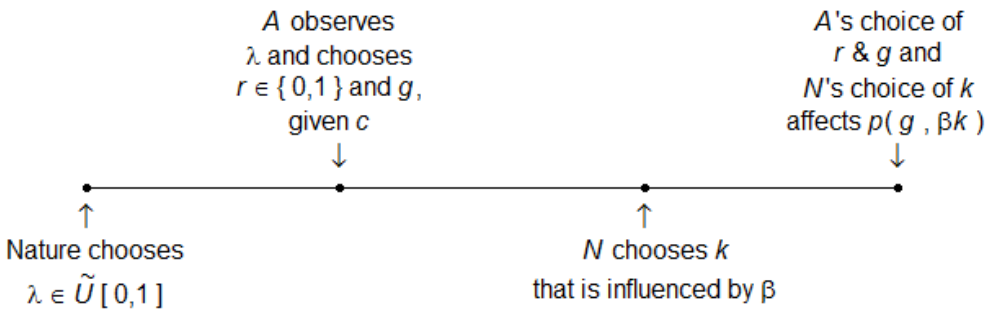


Figure 2.1: Sequence of Moves -

2.3 Equilibrium Results

The model described in the previous section generates a unique separating equilibrium result that is characterized in the following proposition:

Proposition 1: *If* $c < \frac{1-\overline{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$ *and* $\beta > \frac{\sqrt{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$, *there exists a unique separating equilibrium where*

$$\left\{ \begin{array}{c} r(\lambda) = 1 \text{ if } \lambda < \overline{\lambda} \\ k(r) = \frac{c\overline{\lambda}\phi}{(\tau\beta)^2} \text{ if } r = 1,\ \lambda < \overline{\lambda} \text{ and } \tau \in \Re_+ \\ g(1,\lambda) = \left(\sqrt{\frac{\overline{\lambda}}{\lambda}} - \frac{\overline{\lambda}c}{\tau\beta}\right)\frac{\phi}{\tau\beta} \text{ if } r = 1,\ \lambda < \overline{\lambda} \text{ and } \tau \in \Re_+ \end{array} \right\}$$

Proof: See Appendix

Proposition 1 formally characterizes A's best response with respect to its IEA-ratification decision, the optimal level of g offered by A, and the optimal level of k spent by the owners in the model's unique separating equilibrium. In words, this equilibrium result states that autocratic governments that face low constitutional constraints are more likely to ratify the IEA without delay when the output of brown industries as a share of GDP (β) is sufficiently high. A weakly constrained autocratic government is, in fact, more likely to ratify the IEA without delay in the context of high β even if the owners believe *a priori* that this government may renege from its promise of offering compensation.

Conversely, the model also demonstrates that highly constrained autocrats will choose to delay ratification when brown-industry output as a share of GDP is high. This corollary follows from Proposition 1, and can be summarized as:

Proposition 2: *If* $c > \frac{1-\overline{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$ *and* $\beta > \frac{\sqrt{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$, *then* $r(\lambda) = 0$ *if* $\lambda > \overline{\lambda}$ *and thus* $\forall\lambda \in [\overline{\lambda}, 1]$.
Proof: See Appendix

This proposition implies that increases in constitutional constraints will work to reduce authoritarian incentives to immediately ratify IEAs when brown in-

dustry output is sufficiently high. The implications for Proposition 1 and 2 are illustrated in Figure 2.2 (below) which shows (i) that the weakly constrained autocrat's best response is to ratify the IEA without delay as β increases (front-left wall) and (ii) that highly constrained autocrat's best response is to delay ratification as β increases (back-right wall).

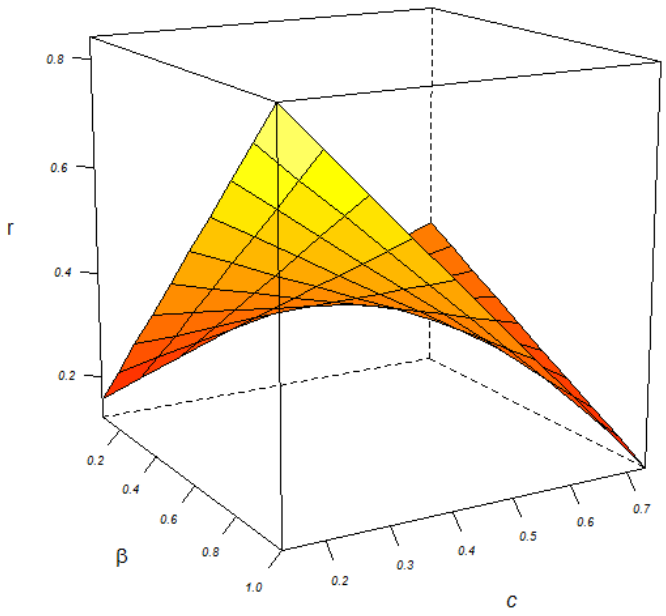


Figure 2.2: Best Response Reaction Functions across c and β -

2.3.1 Discussion

Taken together, Propositions 1 and 2 therefore predict that increases in brown industry dependence will have divergent effects on authoritarian ratification decisions depending on an autocrat's levels of constitutional constraints. Specifically, high industry dependence will expedite IEA-ratification among weakly

constrained autocracies (Preposition 1) but will stall ratification within highly constrained autocracies (Preposition 2). To arrive at these findings, I began by assuming that an autocratic government has positive incentives to ratify an IEA (denoted as $r\alpha$). As argued above, these incentives can arise because—as developing states—authoritarian countries are routinely provided monetary side-payments or policy concessions in return for IEA-ratification and participation (100, 151, 185). These side-payments will be valuable to autocrats given their strong preferences for private goods (164, 216, 554).

Treaty-specific evidence supports these claims. Nearly all prominent IEAs offer positive inducements for membership and participation, and these inducements are often highly fungible. The Basel Convention, for example, has established a Technical Cooperation Trust Fund to assist developing member countries (226). The Convention on Persistent Organic Pollutants (PoPs) also provides "technical assistance...as well as transfer of technology and on-ground investment projects" (227). Likewise, the Convention on Biological Diversity (CBD) obligates developed countries to provide funds that cover the incremental costs of biodiversity conservation within developing countries (100, 397). The Convention on Trade in Endangered Species (CITES) explicitly offers several economic incentives for compliance, including, "Biodiversity funded grants under Projects supported by the Global Environment Facility (GEF) and implemented by International Finance Corporation" (228). The GEF—which is the largest public funder of global environment projects—also serves as a mechanism or partner for many other prominent IEAs, including the CBD, the UN Framework Convention on Climate Change (UNFCCC), the Stockholm Convention, the Convention to Combat Desertification (CCD), the Vienna Convention for the Protection of the Ozone Layer and its Montreal Protocol. The positive inducements that it offers are not only credible, but also sizable, as in the past two decades alone it has provided $10.5 billion in grants and leveraged another $51 billion in co-financing for environmental projects in developing countries (229).

For many authoritarian governments, these side-payments are substantial. For instance, the total multilateral or bilateral donor-based environmental funds accruing to Egypt from 1991-2001 reached nearly $420 million, while GEF support to Egypt over the 1991-2008 period totaled $87.87 million (230, 31-32).

Through its own international environmental engagement, North Korea now has eight GEF-administered environmental projects under way or recently completed (231, 203-204), with a subset of these projects totalling roughly $5 million dollars,[1] all during a period when many other international sources of revenue were nonexistent. Even the largest of autocracies, including China, gain significantly from IEA revenue streams. Schreurs (193) notes that Beijing "has been able to benefit from the Clean Development Mechanism (CDM) of the Kyoto Protocol," hosting 737 CDM projects as of February 2010 (193, 453), wherein more recently, China announced that its CDM fund "will almost double its available cash for renewable energy projects to 10 billion yuan ($1.5 billion) in 2012" (232). There is also good reason to suspect such payments to be highly fungible for autocratic leaders. For instance, Sievers (233) finds that in Central Asia, "World Bank staff violate GEF procedures regularly. GEF proposals require proof of state support before review, and official GEF focal points exist in each state to sign-off on proposals. Instead of proposals to these focal points, World Bank, in every case, has simply asked its primary government contact to sign the proposal, and then claimed that person to be that state's authorized focal point. UNDP has committed numerous similar infractions of GEF protocol with focal points [...]" (233, 192).

While the autocrat in the model stands to accrue benefits from IEA-ratification, domestic (brown) industries will anticipate a series of costs. Indeed, virtually every prominent IEA regulates the production of at least one major industry output or input, be it energy production, logging and wood-based industry, chemical and pharmaceutical production, or heavy manufacturing.[2] Anecdotal evidence across

[1]The latter figure includes the UNDP's Environment and Industrial Pollution Management Support program (US$2million), as well as grants for Conservation of Biodiversity at Mount Myohyan (US$750,000), Costal Biodiversity Management of North Korea's West Sea (US$775,000), and Small Wind Energy Development and Promotion in Rural Areas (US$750,000) (231, 203-204).

[2]Examples of IEAs regulating these specific areas include The Basel Convention on Hazardous Wastes, the UNFCCC and Kyoto Protocol on climate change, The Vienna and Montreal Protocols on substances that deplete the ozone layer, the Stockholm Convention on Persistent Organic Pollutants, and the Convention on Biological Diversity, among others.

countries as varied as China[1], Gabon,[2] Malaysia,[3] Mexico,[4] and Vietnam[5] suggests moreover that autocracies will frequently *enforce* green regulations, to the detriment of firms. Even when an autocrat does not to actively enforce IEA provisions, such IEAs will often ensure that an autocrat's domestic industries nevertheless incur costs. For instance, some IEAs (e.g., CITES and The Montreal Protocol) allow or encourage members to impose trade sanctions against member-countries' economies whose industries are in non-compliance while many others ban the trade in "brown" products altogether (143, 236). Such mechanisms, for example, enabled the US to leverage major trade sanctions in 1994 against (then authoritarian) CITES-member Taiwan for its repeated violations of CITES (236, 60).

Similarly, industries have good reason to be wary even in cases where the initial ratification of a treaty by an authoritarian government does not obligate the immediate greening of brown industries, as many such industries will recognize that even the most shallow IEAs will become more stringent over time. Indeed, the Montreal Protocol has been repeatedly expanded over its lifespan to regulate developing countries more stringently, and to prohibit additional ozone depleting substances such as HFCs, manufactured primarily in China (237). Likewise, and in stark contrast to the UNFCCC and Kyoto Protocol, it has been agreed that the successor agreement to the Kyoto Protocol will legally obligate carbon emissions reductions across all member countries (238), whereas IEAs regulating hazardous wastes have been expanded overtime to not just regulate waste exporters but also (typically developing and authoritarian country) waste importers. Hence, brown industries—with their typically long time horizons and reliance on 10-20

[1] "Government authorities have an incentive to make sure that companies comply as their promotions can be tied to environmental and energy efficiency performance [...] The Chinese government has used climate and environmental goals to justify its decisions to shut down old and inefficient facilities. (193, 455).

[2] See (234, 187).

[3] "In Malaysia, discharge fees have been used since the 1978 to complement a regulatory approach towards solving water pollution from palm oil mills" (235, 244).

[4] See (207, 13).

[5] "Regarding industry, the [National Law on Environmental Protection] stated that all potential FDI should submit an environmental-impact assessment (EIA), which was to be conducted by the NEA, before factory construction or manufacturing could begin. Additionally, the state has begun using economic instruments to internalize costs of environmental protection into industry" (192, 256).

year fixed costs to get a return on investments—have good reason to oppose the ratification of IEAs, even if these IEAs do not directly affect brown industries in the short term.

Accordingly, industry opposition to major IEAs is expected to be widespread, and a number of IEA case-studies support this expectation (188, 189, 190, 191). It is likely, moreover, that industry opposition to IEAs (and its adverse effects) will be most acute in autocracies, which lack strong domestic environmental movements to counteract industry pressures for non-ratification (106, 107, 239). Drawing on this logic, the model assumes that industry owners will increase spending (βk) to remove the autocrat from office in response to IEA-ratification. At this point, the autocrat faces a trade off: it can either choose to forsake the IEA and the monetary benefits that accompany it ($r\alpha$) or it can ratify the IEA and incur a heightened threat of removal from office (βk).

Facing this trade-off, the government in the model promises ex-ante to offer cost-offsetting compensation (g) to the industry owners in return for their IEA-ratification support. The autocrat makes this promise of compensation in order to (i) co-opt and garner the support of brown industry owners for ratification and (ii) thus prolong its survival in office. As argued above, this promised compensation encompasses commitments (to industry) of treaty non-enforcement, tax breaks, financial or fiscal incentives, or promises to not expropriate third party transfers of green aid, and hence will be valued by industry owners upon delivery.

When the constitutional constraints that the autocratic government faces are low, the credibility of the government's promise to provide compensation will be low as well. The model, in fact, suggests that industry owners will believe a priori that they are dealing with a government whose willingness to provide compensation is low only when interacting with a weakly constitutionally constrained autocratic government. As such, the owners in this case will anticipate that A is more likely to renege ex-post (that is, after ratification) in providing g. This commitment problem is common knowledge to the players.

Recall that, if an IEA-ratifying government's promise to provide compensation is not credible, N will put political pressure on A by spending βk—where k denotes some share of their capital—to threaten to remove the government from office. If the output produced by industry as a share of GDP (β) is low, then the

weakly constrained autocrat will be indifferent to the owners' industry preference and will have low (or no) incentives to address the commitment problem described above. But if β is sufficiently high, then the owners' threat to depose A from office—if the latter ignores the owners' preferences—is credible in the model's separating equilibrium. This is because in these cases, the output produced by industry as a share of GDP (β) is sufficiently high so as to ensure that an increase in industry spending to remove the autocrat in office (βk) is sufficient to do so.

The credibility of the owners' threat induces the weakly constrained autocratic government to immediately ratify the IEA. Technically, this outcome arises for two reasons. First, IEA-ratification allows the weakly constrained government to "tie-its-hands" to the provisions—including the provisions associated with compensating brown industries—in the IEA. Second, tying its hands to IEA compensation provisions permits the government in this case to send a costly signal of its commitment to provide owners with cost-offsetting compensation. As argued above, IEAs provide policy concessions and fungible resources to (autocratic) member countries, and industries recognize that authoritarian governments place increasing value upon these resources as their constraints (upon, e.g., using these resources for private means) decrease. However, for these resources to continue to flow, ex-post to ratification, an autocrat must remain in (relatively) good standing with an IEA—which often entails that brown industry exhibits at least some degree of "greening". The monitoring mechanisms—and pro-compliant industry linkages—found within most prominent IEAs[1] ensure that any autocratic decision to renege on its promises of compensation, ex-post, will entail costs for that autocrat via future reductions in (i) IEA resources, (ii) domestic investment, and (iii) international bargaining leverage—in addition to heightened industry spending to remove the autocrat from office. Indeed, anecdotal evidence suggests that

[1]For instance, in addition to encouraging "Parties to link private sector initiatives to the identification of equal and fair economic opportunities for drylands goods and services" (240, 3) the Convention to Combat Desertification (CCD) offers (and publishes) official accreditation for private sector actors aiding in CCD implementation and compliance (241). Similarly, the Convention on the Conservation of Migratory Species of Wild Animals (CMS) stipulates private sector partnerships via formal agreements which obligate that member countries be made aware of partnerships, that private sector partnerships be periodically monitored, that the results of partnerships be reported to CMS committees, and, where appropriate, that business entity-partners be authorized and granted the right to use the UN/UNEP/CMS Name and Emblem (CMS "Partnership Code of Conduct": (136).

authoritarian politicians perceive publicized violations of environmental and pollution accords to be economically costly, to the point which the governments of Malaysia[1] and China[2] have sought to cover up such violations for these expressed reasons.

Highly constrained authoritarian regimes, on the other hand, do not face such a commitment dilemma. In the model, high constitutional constraints serve as a screening mechanism for an autocrat's propensity to renege on its compensation promises. Specifically, these high constraints reveal, albeit imperfectly, information to brown-industry owners that the constrained autocrat has greater political incentives to follow through on his promise and provide compensation to the owners. The screening mechanism provided by higher constraints accordingly (i) reduces the incentives for constrained autocrats to incur the transaction costs associated with immediate IEA-ratification and (ii) provides a viable alternative for autocrats to make credible promises to brown-industry owners. These features, together with the heightened IEA-ratification costs that arise as industry size (via promised compensation allotments) and constitutional constraints each expand, work to ensure that highly constrained autocrats become less likely to expeditiously ratify IEAs as their industry dependence increases.

Hence, IEA-ratification uniquely commits unconstrained authoritarian governments to providing industry owners with compensation. As demonstrated formally in the following claim, this signal results in the actual provision of compensation to the owners which thus enhances the credibility of the weakly constrained A's commitment to the owners. This is the prediction summarized in Claim 1:

Claim 1: *In the separating equilibrium where* $g(1,\lambda) = \left(\sqrt{\frac{\overline{\lambda}}{\lambda}} - \frac{\overline{\lambda}c}{\tau\beta}\right)\frac{\phi}{\tau\beta}$ *if* $\lambda < \overline{\lambda}$, $\tau \in \Re_+$ *and* $\phi > 0$; $g(1,\lambda)$ *is strictly positive for* $r = 1$ *when* c *is low and* β *is sufficiently high.*

[1] On Malaysia's non-reporting of air pollution: "the government said it would not start publishing the index again because it might scare away tourists. The haze hurt Malaysia's tourism industry in 1997, with the number of visitors falling by 13% to 6.2 million, compared with 7.1 million the year before" (242).

[2] "Liu Shuai, a former environmental official from Hunan, said the authorities would not dare show pollution data, fearing it would harm economic interests" (243).

Proof: See Appendix

Claim 1 shows that IEA-ratification will serve as a credible signal of compensation provision when an autocracy is relatively unconstrained *and* industry-dependent—and that compensation will therefore be provided under these circumstances. A key implication of this credible aid-promise is that brown industry owners will accordingly reduce the revenue that they spend to remove an unconstrained autocrat in equilibrium—further incentivizing autocrats' decisions to expedite IEA-ratification.[1] Together with Preposition 1, this indicates that unconstrained autocracies will, in equilibrium, ratify IEAs more quickly as their industry dependence increases, whereas the opposite relationship will hold for constrained autocracies (Proposition 2). The preceding discussion thereby leads to the following testable hypotheses:

Hypothesis 1: *Industry dependence increases the speed of IEA-ratification under unconstrained autocracies*

Hypothesis 2: *Industry dependence decreases the speed of IEA-ratification under constrained autocracies*

As mentioned above, the ex-ante credibility of A's commitment has another ex-post effect. Specifically, as demonstrated formally in the following claim, this credibility induces the owners (whose industry output as a share of GDP is high) to rationally accept A's ratification decision and thus curtail βk in equilibrium. This prediction is summarized in Claim 2.

Claim 2: *In the separating equilibrium where* $k(r) = \frac{c\overline{\lambda}\phi}{(\tau\beta)^2}$ *if* $\lambda < \overline{\lambda}$, $\tau \in \Re_+$ *and* $\phi > 0$,
$k(r)$ *strictly decreases for* $r = 1$ *when* c *is low and* β *increases (and is thus sufficiently high).* **Proof:** See Appendix

[1] This is derived formally in Claim 2 below.

Substantively, Claim 2 indicates that when a commitment to compensation is credible—as is the case for weakly constitutionally constrained autocracies with high industry dependence that ratify an IEA—industry owners will reduce the capital spent to remove an autocrat from office. Note that in the model, the weakly constrained autocratic government anticipates the owners' behavior summarized in Claim 2 and by backwards induction, this further encourages A to ratify. This is demonstrated graphically in Figure 2.3 below, which shows that best response reaction functions for $g(\cdot)$ and $k(\cdot)$ as derived from the model. One can note here, for example, that the reaction functions for $g(\cdot)$ and $k(\cdot)$ cross at only one point; wherein λ (the autocratic government's true "willingness" to provide compensation) and c (constitutional constraints) are relatively low—denoting weakly constrained industry dependent authoritarian regimes.

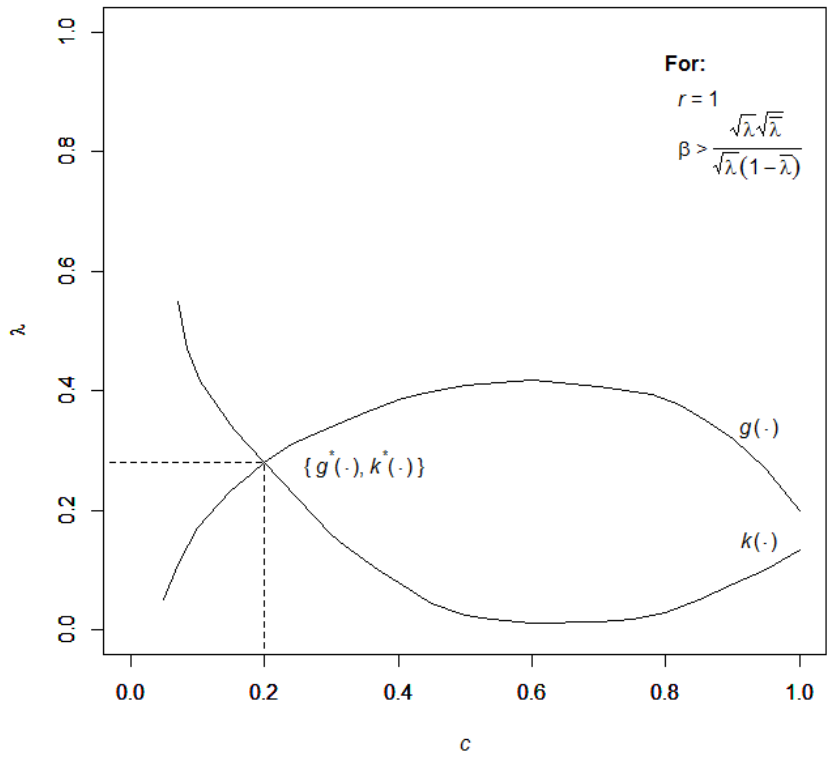


Figure 2.3: Best Response Reaction Functions for $g(\cdot)$ and $k(\cdot)$ -

In sum, Claim 2 demonstrates that the model predicts a decrease in βk in the separating equilibrium result presented in Figure 2.3 (i.e., among unconstrained industry dependent autocrats that choose to ratify the IEA). Because βk formally characterizes the capital spent by industry owners to remove an autocrat from power, this effect, in turn, enhances the autocrat's probability of surviving in office. The implications of this comparative-static result for the autocrat's survival are demonstrated formally in the following preposition:

Proposition 3: *In the separating equilibrium,the probability of survival for autocratic regimes increases for* $r = 1$, $\lambda < \overline{\lambda}$ *and* $\tau \in \Re_+$ *when c is low and* β *is sufficiently high.*

Proof: See Appendix

Proposition 3 thereby predicts that weakly constitutionally constrained autocrats with high industry dependence will *prolong* their survival in office—and curtail any industry-spending to remove them from office—by ratifying IEAs. Under conditions of low constitutional constraints, IEA-ratification should therefore reduce the likelihood of (i) industry mobilization against autocracies and (ii) authoritarian breakdown as brown industry dependence increases. This logic—as described formally in Claim 2 and Preposition 3—generates a third, and final, testable hypothesis:

Hypothesis 3: *IEA treaty ratification will increase an unconstrained autocrat's survival in office as industry dependence increases*

2.4 Conclusion

In this chapter I sought to explain why some authoritarian countries choose to ratify IEAs quickly while others seemingly choose to delay IEA-ratification indefinitely. To do so, I characterized an authoritarian government's decision to ratify an IEA as being the result of an outcome of strategic interaction between an authoritarian leader—who values IEA ratification for monetary or policy benefits—and owners of industry—whom oppose IEA-ratification due to the costs IEAs

impose on industrial production. The model suggests that authoritarian leaders can reduce industry opposition to IEA-ratification if they can credibly commit to providing industries with compensation ex-post to IEA-ratification. However, not all authoritarian leaders will make good on their ex-ante promises to provide compensation; and industries cannot know definitively (ex-ante) whether a given authoritarian regime is truly committed to providing compensation (ex-post). Using the one-sided incomplete information signaling model developed above, I was able to to determine *when* authoritarian leaders are more likely to use IEA-ratification as a credible signal to industry owners that they (i.e. the autocrats) are committed to providing compensation. In short, the unique separating equilibrium derived from this model suggests that unconstrained authoritarian regimes with high industry dependence are the only subset of autocrats that will use IEA-ratification as a "hands-tying strategy" in this manner.

This finding—along with the related claims and prepositions summarized above—allow me to derive three empirically testable hypotheses. First and foremost, the model predicts that weakly constitutionally constrained autocrats will ratify IEAs more quickly as their dependence on industry increases. As a corollary to this hypothesis, the model also suggests that highly constitutionally constrained autocrats will not be able to use IEA-ratification as a commitment mechanism, and accordingly should instead see industry dependence lead to slower—not faster—IEA ratification. Finally, the signaling model above shows that—in instances where autocrats are in fact able to tie their hands with IEA ratification[1]—doing so will effectively commit the autocrat to providing compensation (ex-post), which will in turn reduce the capital spent by brown industry owners to depose of the autocrat, thereby enhancing the autocrat's likelihood of surviving in office. Thus, for unconstrained autocracies, IEA-ratification should raise the probability of authoritarian-regime survival as brown industry-dependence increases.

[1]I.e. for unconstrained autocracies with high industry dependence.

Table 2.1: Table of Terms

Notation	Definition
A	Autocratic government
N	Owners of Industry
ϕ	Rent from being in office for A; Rent from capturing office for N
r	Term denoting whether an autocrat chooses to ratify ($r = 1$) or not ratify ($r = 0$)
$r\alpha$	Autocrat's payoff from ratifying
k	Capital spent by N to (sponsor political opposition to) depose A from office
β	Industry output as a share of GDP
βk	Total resources spent by N to potentially depose A
$p(g, \beta k)$	The autocrat's probability of survival in office
c	Constitutional constraints on lawmaking faced by A
g	Amount of compensation provided by government to industry

2.5 Appendix

2.5.1 Proofs

Proposition 1: *If* $c < \frac{1-\overline{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$ *and* $\beta > \frac{\sqrt{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$, *there exists a unique separating equilibrium where*

$$\left\{ \begin{array}{c} r(\lambda) = 1 \text{ if } \lambda < \overline{\lambda} \\ k(r) = \frac{c\overline{\lambda}\phi}{(\tau\beta)^2} \text{ if } r = 1,\ \lambda < \overline{\lambda} \text{ and } \tau \in \Re_+ \\ g(1,\lambda) = \left(\sqrt{\frac{\overline{\lambda}}{\lambda}} - \frac{\overline{\lambda}c}{\tau\beta}\right)\frac{\phi}{\tau\beta} \quad \text{if } r = 1,\ \lambda < \overline{\lambda} \text{ and } \tau \in \Re_+ \end{array} \right\}$$

Proof: I present this proof in five steps. In the first two steps, I check whether A and N are —given any signal —playing their respective best response. I also

formally derive and characterize $g(1,\lambda)$ and $k(r)$ for $\lambda < \overline{\lambda}$ when $r = 1$.Given each player's best response, I then check in the third step whether autocratic government types $\lambda < \overline{\lambda}$ have an incentive to deviate from their best response of $r(\lambda) = 1$. To preview, the third step of the proof shows that autocratic government types $\lambda < \overline{\lambda}$ will not deviate from $r(\lambda) = 1$ when $c < \frac{1-\overline{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$ *and* $\beta > \frac{\sqrt{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$. In the fourth step, I show that the separating equilibrium result stated above is unique. Finally, in the fifth step I show that a pooling equilibrium does not exist where $r(\lambda) = 1 \ \forall \ \lambda \in [0,1]$ when $c < \frac{1-\overline{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$ and $\beta > \frac{\sqrt{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$.

I. Let $r = 1$. The first-order condition (hereafter f.o.c) of u_A with respect to g is $\frac{\partial u_A}{\partial g} = \frac{\partial p(g,k,\beta)}{\partial g}\phi - c\lambda = 0$. From $\frac{\partial u_A}{\partial g}$, I obtain the reaction function $g(1,\lambda,k) = \sqrt{\frac{k\phi}{c\lambda}} - c$. When the owners observe $r = 1$, they will maximize (from u_N), the following expression

$$eu_N = \int_0^{\overline{\lambda}} [\pi + (1 - p(g(k,1),k,\beta))\phi - \beta k]h(1)d\lambda$$

where (i) $h(1)$ is the posterior distribution of λ (where $\lambda \tilde{} U[0,1]$) over the *updated* support $\left[0,\overline{\lambda}\right]$ conditional on the signal $r = 1$ and (ii) $p(g(k,1),k,\beta) = \frac{g(1,\lambda,k)}{g(1,\lambda,k)+\beta k(1)}$. Since $g(1,\lambda,k) = \sqrt{\frac{k\phi}{c\lambda}} - c$, it follows that $p(g(k,1),k,\beta) = 1 - \sqrt{\frac{\beta kc\lambda}{\phi}}$.Substituting $p(g(k,1),k,\beta) = 1 - \sqrt{\frac{\beta kc\lambda}{\phi}}$ into eu_N and differentiating eu_N with respect to k leads to $\frac{\partial eu_N}{\partial k} = \int_0^{\overline{\lambda}}[(1/2)\sqrt{\frac{\beta c\phi\lambda}{k}} - \beta]h(1)d\lambda = 0$ which$\Longrightarrow$ $k(1) = \frac{c\overline{\lambda}\phi}{(\tau\beta)^2}$ where $\tau \in \Re_+$ as claimed. After substituting k with $\frac{c\overline{\lambda}\phi}{(\tau\beta)^2}$ in the expression for $g(1,\lambda,k)$, I obtain after some algebra $g(1,\lambda) = \left(\sqrt{\frac{\overline{\lambda}}{\lambda}} - \frac{\overline{\lambda}c}{\tau\beta}\right)\frac{\phi}{\tau\beta}$ as claimed. Hence, if $\tau = 3$, then $g(1,\lambda) = \left(\sqrt{\frac{\overline{\lambda}}{\lambda}} - \frac{\overline{\lambda}c}{3\beta}\right)\frac{\phi}{3\beta}$.

II. Let $r = 0$. Note that $\frac{\partial u_A}{\partial g} = \frac{\partial p(g,k,\beta)}{\partial g}\phi - \lambda = 0$ which yields the reaction function $g(0,\lambda,k) = \sqrt{\frac{k\phi}{\lambda}} - c$. When the owners observe $r = 0$, they maximize

$$eu_N = \int_{\overline{\lambda}}^{1} [\pi + [(1 - p(g(k,0),k,\beta))\phi - \beta k]h(0)d\lambda$$

where (i) $h(0)$ is the posterior distribution of λ over updated support $\left[\overline{\lambda},1\right]$ conditional on the signal $r=0$ and (ii) $p(g(k,0),k,\beta)=1-\sqrt{\frac{\beta k\lambda}{\phi}}$.Hence when $r=0$ and $p(g(k,0),k,\beta)=1-\sqrt{\frac{\beta k\lambda}{\phi}}$ I obtain in this case, $\frac{\partial eu_N}{\partial k}=\int_{\overline{\lambda}}^{1}[(1/2)\sqrt{\frac{\beta\phi\lambda}{k}}-\beta]h(0)d\lambda=0$ which leads to $k(0)=\frac{(1-\overline{\lambda}\sqrt{\overline{\lambda}})^2\phi}{(1-\overline{\lambda})^2(\tau\beta)^2}$ where $\tau\in\Re_+$. Substituting k with $\frac{(1-\overline{\lambda}\sqrt{\overline{\lambda}})^2\phi}{(1-\overline{\lambda})^2(\tau\beta)^2}$ in the expression for $g(0,\lambda,k)$, I obtain $g(0,\lambda)=\frac{(1-\overline{\lambda}\sqrt{\overline{\lambda}})^2\phi}{(1-\overline{\lambda})^2(\tau\beta)^2}\left(\sqrt{\frac{1}{\lambda}}-\frac{(1-\overline{\lambda}\sqrt{\overline{\lambda}})}{(1-\overline{\lambda})(\tau\beta)}\right)$. If $\tau=3$, then $g(0,\lambda)=\frac{(1-\overline{\lambda}\sqrt{\overline{\lambda}})^2\phi}{(1-\overline{\lambda})^2(3\beta)^2}\left(\sqrt{\frac{1}{\lambda}}-\frac{(1-\overline{\lambda}\sqrt{\overline{\lambda}})}{(1-\overline{\lambda})(3\beta)}\right)$.

III. Given the proof in parts **I** and **II** now check whether autocratic governments' of type $\lambda<\overline{\lambda}$ have an incentive to deviate from $r=1$ to $r=0$. Let $\lambda\in(0,\overline{\lambda})$ (that is, $\lambda<\overline{\lambda}$) and $r=1$. When $r=1$, it follows that $u_A=p(g(1,\lambda),k(1))\phi-g\lambda c(1,\lambda)$ which is equivalent to $\phi[1-(\sqrt{\lambda}\sqrt{\overline{\lambda}})\frac{c}{\tau\beta}]-\left(\sqrt{\frac{\overline{\lambda}}{\lambda}}-\frac{\overline{\lambda}c}{\tau\beta}\right)\frac{\phi c\lambda}{\tau\beta}$. Note that $\phi[1-(\sqrt{\lambda}\sqrt{\overline{\lambda}})\frac{c}{\tau\beta}]-\left(\sqrt{\frac{\overline{\lambda}}{\lambda}}-\frac{\overline{\lambda}c}{\tau\beta}\right)\frac{\phi c\lambda}{\tau\beta}=\phi\left(1-(\sqrt{\lambda}\sqrt{\overline{\lambda}})\frac{c}{\tau\beta}\right)^2$. When $r=0$, $u_A=p(g(0,\lambda),k(0))\phi-g\lambda(0,\lambda)$ which is equal to $\phi[1-\frac{\sqrt{\lambda}(1-\overline{\lambda}\sqrt{\overline{\lambda}})}{(1-\overline{\lambda})\tau\beta}]^2$. A will thus *not deviate* from $r=1$ to $r=0$ if $p(g(1,\lambda),k(1))\phi-g\lambda c(1,\lambda)>p(g(0,\lambda),k(0))\phi-g\lambda(0,\lambda)$ which implies that deviation will not occur if $\phi\left(1-(\sqrt{\lambda}\sqrt{\overline{\lambda}})\frac{c}{\tau\beta}\right)^2>\phi[1-\frac{\sqrt{\lambda}(1-\overline{\lambda}\sqrt{\overline{\lambda}})}{(1-\overline{\lambda})\tau\beta}]^2$. If $\lambda<\overline{\lambda}$, the inequality $\phi\left(1-(\sqrt{\lambda}\sqrt{\overline{\lambda}})\frac{c}{\tau\beta}\right)^2>\phi[1-\frac{\sqrt{\lambda}(1-\overline{\lambda}\sqrt{\overline{\lambda}})}{(1-\overline{\lambda})\tau\beta}]^2$ holds when the following conditions are met: $c<\frac{1-\overline{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$ and $\beta>\frac{\sqrt{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$.[1] Thus if $c<\frac{1-\overline{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$ and $\beta>\frac{\sqrt{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$, then for $\lambda<\overline{\lambda}$, A will *not deviate* from $r=1$ to $r=0$ as claimed in Proposition 1.

IV. To prove uniqueness, I need to check whether (i) $\overline{\lambda}$ lies in the interior of $[0,1]$ type space (that is, $\overline{\lambda}\in[0,1]$) when $c<\frac{1-\overline{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$and $\beta>\frac{\sqrt{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$ and (ii) autocratic governments' of type $\lambda>\overline{\lambda}$ have an incentive to deviate from $r=1$ to $r=0$ when $c<\frac{1-\overline{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$and $\beta>\frac{\sqrt{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$. First, observe that $\forall\lambda<\overline{\lambda}$ and thus $\forall\lambda\in[0,\overline{\lambda}]$, $\overline{\lambda}\in[0,1]$ when $(1-(\sqrt{\lambda}\sqrt{\overline{\lambda}})\frac{c}{\tau\beta})>0$ and $[1-\frac{\sqrt{\lambda}(1-\overline{\lambda}\sqrt{\overline{\lambda}})}{(1-\overline{\lambda})\tau\beta}]>0$. One can

[1] $c<\frac{1-\overline{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$ and $\beta>\frac{\sqrt{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$also ensure that $\left(1-(\sqrt{\lambda}\sqrt{\overline{\lambda}})\frac{c}{\tau\beta}\right)>0$ and $[1-\frac{\sqrt{\lambda}(-\overline{\lambda}\sqrt{\overline{\lambda}}}{(1-\overline{\lambda})\tau\beta}]>0$.

check that $(1-(\sqrt{\lambda}\sqrt{\overline{\lambda}})\frac{c}{\tau\beta}) > 0$ and $[1-\frac{\sqrt{\lambda}(1-\overline{\lambda}\sqrt{\overline{\lambda}})}{(1-\overline{\lambda})\tau\beta}] > 0$ when $c < \frac{1-\overline{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$and $\beta > \frac{\sqrt{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$ which $\Longrightarrow \overline{\lambda} \in [0,1]$) when $c < \frac{1-\overline{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$and $\beta > \frac{\sqrt{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$. Second, if $r = 1$, then $U_A = p(g(1,\lambda),k(1))\phi - g\lambda c(1,\lambda) = \phi\left(1-(\sqrt{\lambda}\sqrt{\overline{\lambda}})\frac{c}{\tau\beta}\right)^2$ $\forall\lambda > \overline{\lambda}$ and therefore $\forall\lambda \in [\overline{\lambda},1]$. If $r = 0$, then $u_A = p(g(0,\lambda),k(0))\phi - g\lambda(0,\lambda) = \phi[1-\frac{\sqrt{\lambda}(1-\overline{\lambda}\sqrt{\overline{\lambda}})}{(1-\overline{\lambda})\tau\beta}]^2$ $\forall\lambda > \overline{\lambda}$, $\forall\lambda \in [\overline{\lambda},1]$. Observe that $\forall\lambda > \overline{\lambda}$ $\phi\left(1-(\sqrt{\lambda}\sqrt{\overline{\lambda}})\frac{c}{\tau\beta}\right)^2 < \phi[1-\frac{\sqrt{\lambda}(1-\overline{\lambda}\sqrt{\overline{\lambda}})}{(1-\overline{\lambda})\tau\beta}]^2$when $c < \frac{1-\overline{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$and $\beta > \frac{\sqrt{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$. Thus autocratic governments' of type $\lambda > \overline{\lambda}$ will deviate from $r = 1$ to $r = 0$ when $c < \frac{1-\overline{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$and $\beta > \frac{\sqrt{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$.

V. Follows directly from the proof of part **IV** in Proposition 1. I also need to check whether the pooling equilibrium survives the (244) intuitive criterion. In a pooling equilibrium – where all types ($\lambda \in [0,1]$) ratify the treaty– $U_A^{pool}(\lambda) = p(g(1,\lambda),k(1))\phi - g\lambda c(1,\lambda) = \phi\left(1-\sqrt{\lambda}\frac{c}{\tau\beta}\right)$ $\forall$ $\lambda \in [0,1]$. Now consider out-of-equilibrium beliefs where A chooses not to ratify the treaty; in this case, it is plausible that the posterior belief for N is given by $\lambda = 1$. If $\lambda = 1$, then from the expression for $p(g(1,\lambda),k(1))\phi - g\lambda c(1,\lambda)$ described above, I obtain $U_A^{defect}(1) = p(g(1,1),k(1))\phi - gc(1,1) = \phi\left(1-\frac{1}{\tau\beta}\right)$. I now need to check whether $U_A^{defect}(1) > U_A^{pool}(\lambda)$ or, in other words, whether $\phi\left(1-\frac{1}{\tau\beta}\right) > \phi\left(1-\sqrt{\lambda}\frac{c}{\tau\beta}\right)$. The inequality $\phi\left(1-\frac{1}{\tau\beta}\right) > \phi\left(1-\sqrt{\lambda}\frac{c}{\tau\beta}\right)$ holds under the following two conditions. First, $\phi\left(1-\frac{1}{\tau\beta}\right) > \phi\left(1-\sqrt{\lambda}\frac{c}{\tau\beta}\right)$ if $\frac{1}{\tau\beta} < \sqrt{\lambda}\frac{c}{\tau\beta}$ or if $\frac{1}{c^2} < \lambda$. Since $\lambda = 1$ in this case and because $c < \frac{1-\overline{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$, it follows that $c > 0$ $\forall$ $\lambda \in [0,1]$. Note that $c > 0$ means that $\frac{1}{c^2} < \lambda$ which implies that $\phi\left(1-\frac{1}{\tau\beta}\right) > \phi\left(1-\sqrt{\lambda}\frac{c}{\tau\beta}\right)$ and thus that $U_A^{defect}(1) > U_A^{pool}(\lambda)$. Second, $\phi\left(1-\frac{1}{\tau\beta}\right) > \phi\left(1-\sqrt{\lambda}\frac{c}{\tau\beta}\right)$ if $\beta \neq 0$. Since $\beta > \frac{\sqrt{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$, it follows that $\beta \neq 0$ $\forall$ $\lambda \in [0,1]$.$\beta \neq 0$ implies that $\phi\left(1-\frac{1}{\tau\beta}\right) > \phi\left(1-\sqrt{\lambda}\frac{c}{\tau\beta}\right)$ and thus that $U_A^{defect}(1) > U_A^{pool}(\lambda)$.Likewise, one can easily check that if the posterior belief for N is given by $\lambda = 0$, then $U_A^{defect}(0) > U_A^{pool}(\lambda)$. Thus a pooling equilibrium where all types ($\lambda \in [0,1]$) ratify the treaty does not survive Cho and Krep's

(1987) intuitive criterion.

Claim 1: *In the separating equilibrium where* $g(1,\lambda) = \left(\sqrt{\frac{\overline{\lambda}}{\lambda}} - \frac{\overline{\lambda}c}{\tau\beta}\right)\frac{\phi}{\tau\beta}$ *if* $\lambda < \overline{\lambda}$, $\tau \in \Re_+$ *and* $\phi > 0$

$g(1,\lambda)$ *is strictly positive for* $r = 1$ *when* c *is low and* β *is sufficiently high.*

Proof: For $c \in [0,1]$, let $\lim_{c\to 0}$ in $g(1,\lambda)$. For $\beta \in [0,1]$, let $\lim_{\beta\to 1}$ in $g(1,\lambda)$. In the separating equilibrium, for $r = 1$, $\lambda < \overline{\lambda}$, $\tau \in \Re_+$ and $\phi > 0$, $g(1,\lambda) = \left(\sqrt{\frac{\overline{\lambda}}{\lambda}}\right)\frac{\phi}{\tau} > 0$ when $\lim_{c\to 0}$ and $\lim_{\beta\to 1}$.

Claim 2: *In the separating equilibrium where* $k(r) = \frac{c\overline{\lambda}\phi}{(\tau\beta)^2}$ *if* $\lambda < \overline{\lambda}$,$\tau \in \Re_+$*and* $\phi > 0$, $k(r)$ *strictly decreases for* $r = 1$ *when* c *is low and* β *increases (and is thus sufficiently high) .*

Proof: $\frac{\partial k(r)}{\partial \beta} = \frac{-2(c\overline{\lambda}\phi)}{(\tau\beta)^3} < 0$ and furthermore $\lim_{c\to 0}\frac{\partial k(r)}{\partial \beta} = \frac{-2(c\overline{\lambda}\phi)}{(\tau\beta)^3} \to 0$ for $r = 1$, $\lambda < \overline{\lambda}$ *and* $\tau \in \Re_+$.

Proposition 2: *If* $c > \frac{1-\overline{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$*and* $\beta > \frac{\sqrt{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$, *then* $r(\lambda) = 0$ *if* $\lambda > \overline{\lambda}$ *and thus* $\forall\lambda \in [\overline{\lambda}, 1]$.

Proof: Let $\lambda > \overline{\lambda}$ which $\Longrightarrow \lambda \in [\overline{\lambda}, 1]$ in this case. I first need to check *when* autocratic governments' of type $\lambda > \overline{\lambda}$ will not have an incentive to deviate from $r = 0$ to $r = 1$. If $r = 0$, then $u_A = p(g(0,\lambda), k(0))\phi - g\lambda(0,\lambda) = \phi[1 - \frac{\sqrt{\lambda}(1-\overline{\lambda}\sqrt{\overline{\lambda}})}{(1-\overline{\lambda})\tau\beta}]^2$ $\forall\lambda > \overline{\lambda}$ and therefore $\forall\lambda \in [\overline{\lambda}, 1]$. If $r = 1$, then $u_A = p(g(1,\lambda), k(1))\phi - g\lambda c(1,\lambda) = \phi\left(1 - (\sqrt{\lambda}\sqrt{\overline{\lambda}})\frac{c}{\tau\beta}\right)^2$ $\forall\lambda > \overline{\lambda}$ and therefore $\forall\lambda \in [\overline{\lambda}, 1]$. Thus autocratic governments of type $\lambda > \overline{\lambda}$ (i.e.$\forall\lambda \in [\overline{\lambda}, 1]$) will *not deviate* from $r = 0$ to $r = 1$ when $\phi[1 - \frac{\sqrt{\lambda}(1-\overline{\lambda}\sqrt{\overline{\lambda}})}{(1-\overline{\lambda})\tau\beta}]^2 > \phi\left(1 - (\sqrt{\lambda}\sqrt{\overline{\lambda}})\frac{c}{\tau\beta}\right)^2$. $\forall\lambda > \overline{\lambda}$ and thus $\forall\lambda \in [\overline{\lambda}, 1]$, $\phi[1 - \frac{\sqrt{\lambda}(1-\overline{\lambda}\sqrt{\overline{\lambda}})}{(1-\overline{\lambda})\tau\beta}]^2 > \phi\left(1 - (\sqrt{\lambda}\sqrt{\overline{\lambda}})\frac{c}{\tau\beta}\right)^2$ if and only if $c > \frac{1-\overline{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$and $\beta > \frac{\sqrt{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$. Hence autocratic governments' of type $\lambda > \overline{\lambda}$and thus $\forall\lambda \in [\overline{\lambda}, 1]$ will *not* deviate from $r = 0$ to $r = 1$ when $c > \frac{1-\overline{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$and $\beta > \frac{\sqrt{\lambda}\sqrt{\overline{\lambda}}}{\sqrt{\overline{\lambda}}(1-\overline{\lambda})}$.

Proposition 3: *In the separating equilibrium,the probability of survival for autocratic regimes increases for* $r = 1$, $\lambda < \overline{\lambda}$ *and* $\tau \in \Re_+$ *when* c *is low and* β *is sufficiently high.*

Proof: In equilibrium, $p(g(k,1),k,\beta) = \frac{g(1,\lambda,k)}{g(1,\lambda,k)+\beta k(1)}$from the proof of proposition 1 which is equivalent to $p(g(k),k,\beta) = \frac{g(1,\lambda)}{g(1,\lambda)+\beta k}$for $r = 1$. $p(g(k,1),k,\beta) \in [0,1]$ and thus $p(g(k),k,\beta) \in [0,1]$. Further, from the proof in part **I** of Proposition 1, I know that (i) $k(1) = \frac{c\overline{\lambda}\phi}{(\tau\beta)^2}$ (in other words, $k = \frac{c\overline{\lambda}\phi}{(\tau\beta)^2}$for $r = 1$), (ii) after substituting k with $\frac{c\overline{\lambda}\phi}{(\tau\beta)^2}$ in the expression for $g(1,\lambda,k)$, I get $g(1,\lambda) = \left(\sqrt{\frac{\overline{\lambda}}{\lambda}} - \frac{\overline{\lambda}c}{\tau\beta}\right)\frac{\phi}{\tau\beta}$, and (iii) $\beta k(1) = \beta\frac{c\overline{\lambda}\phi}{(\tau\beta)^2}$(in other words, $\beta k = \frac{c\overline{\lambda}\phi}{(\tau\beta)^2}$for $r = 1$). Substituting $g(1,\lambda) = \left(\sqrt{\frac{\overline{\lambda}}{\lambda}} - \frac{\overline{\lambda}c}{\tau\beta}\right)\frac{\phi}{\tau\beta}$, and $\beta k = \beta\frac{c\overline{\lambda}\phi}{(\tau\beta)^2}$ in $p(g(k),k,\beta) = \frac{g(1,\lambda)}{g(1,\lambda)+\beta k}$ leads to $p(g(k),k,\beta) = \frac{\left(\sqrt{\frac{\overline{\lambda}}{\lambda}} - \frac{\overline{\lambda}c}{\tau\beta}\right)\frac{\phi}{\tau\beta}}{\left(\sqrt{\frac{\overline{\lambda}}{\lambda}} - \frac{\overline{\lambda}c}{\tau\beta}\right)\frac{\phi}{\tau\beta} + \beta\frac{c\overline{\lambda}\phi}{(\tau\beta)^2}}$. Recall from the proof of Proposition 2 that for $c \in [0,1]$, $\lim_{c\to 0}$ and for $\beta \in [0,1]$, $\lim_{\beta\to 1}$. Note that for $r = 1$, $\lambda < \overline{\lambda}$, $\tau \in \Re_+$and $\phi > 0$, $p(g(k),k,\beta) = \frac{\sqrt{\frac{\overline{\lambda}}{\lambda}}}{\sqrt{\frac{\overline{\lambda}}{\lambda}}}$ when $\lim_{c\to 0}$ and $\lim_{\beta\to 1}$; this implies that $p(g(k),k,\beta) = \frac{\sqrt{\frac{\overline{\lambda}}{\lambda}}}{\sqrt{\frac{\overline{\lambda}}{\lambda}}} \to 1$ when $\lim_{c\to 0}$ and $\lim_{\beta\to 1}$. This means that $\lim_{c\to 0,\beta\to 1} p(g(k),k,\beta)$ strictly increases in the $[0,1]$ interval as $p(g(k),k,\beta)$ is bounded above by 1.

3

Authoritarian Strategies of Environmental Treaty Ratification

3.1 Introduction

While authoritarian countries are generally unlikely to (hastily) ratify international environmental agreements (IEAs), a sizable subset of autocracies nevertheless join and ratify IEAs with alarming speed. What explains this continuative variation? That is, why do some autocrats ratify IEAs quickly while many others do not? The previous chapter sought to answer this question by modeling an authoritarian state's decision to ratify an IEA as being the result of a bargaining outcome between an autocrat and domestic brown industry owners. Employing a signaling model, IEA-ratification was assumed to provide authoritarian leaders with positive political-economic benefits,[1] but to potentially impose costs upon brown industries by forcing these industries to become more green. These production costs, I argued, compelled industry owners to oppose IEA-ratification and to accordingly threaten to depose of authoritarian leaders in the instances where

[1]Such as monetary and reputational payoffs or preferential treatment within other international regimes and issue areas. For example it is widely regarded that the European Union agreed to support Russian membership in the World Trade Organization in exchange for Russia's ratification of the Kyoto Protocol (151, 58-59).

an IEA was nevertheless ratified. When credible,[1] these industry-based threats present autocratic leaders with a dilemma: they can ratify the IEA, and attempt to stave-off industry challenges with the promise of cost-offsetting compensation;[2] or they can avoid ratifying the IEA altogether, and sacrifice any (monetary or policy) benefits that they stand to accrue from IEA-ratification.

At this point in the game, an information asymmetry arises between the authoritarian leader and brown industry owners. Due to their short time horizons and preferences for private goods (164, 215, 216, 554), it is difficult for autocrats—and particularly weakly constitutionally constrained autocrats—to credibly commit to providing compensation to industries, ex-ante. Indeed, when the autocrat exhibits low constitutional constraints, the signaling game presented in Chapter 2 indicates that the credibility of the government's promise to provide compensation will be low as well. Therefore, prior to IEA-ratification, industry owners are uncertain as to the credibility of an authoritarian leader's aid promise, though they can infer that weak constitutional constraints generally imply lower levels of aid-commitment credibility. This incomplete information dilemma creates a strategic bargaining problem for industry owners and authoritarian leaders as these two sides seek to reach an agreement over IEA-ratification and subsequent levels of compensation. Chapter 2 analyzes this information problem with a one-sided incomplete information signaling model, treating IEA-ratification as a (costly) signal of authoritarian commitment to compensation, and examining the credibility of this signal under (i) highly or weakly constitutionally constrained authoritarian regimes and (ii) authoritarian regimes with high-to-low levels of reliance on domestic brown industry output for survival.

The signalling game reveals that weakly constrained autocrats with high industry dependence are the only types of authoritarian regimes that are able to credibly signal their commitment to provide compensation through the ratification of an IEA. This result holds for only this subset of authoritarian regimes

[1] Which, I find, is the case when industry output–as a share of the total economy—is sufficiently large.

[2] This compensation can encompasses clandestine commitments to IEA nonenforcement by the autocrat, assurances of state financial assistance for IEA implementation (e.g., preferential tax treatment, regulatory treatment, or financial incentives), or promises to not capture industry-destined international aid (from, e.g., the IEA itself or other member-countries).

because (i) weakly constrained autocrats are best suited to "tie-their-hands" to compensation commitments through the use of the monetary benefits provided to them by IEAs and (ii) it is only in the cases of high industry dependence wherein industry owners' threats of leadership-removal are sufficiently credibility to induce these weakly constrained autocratic government to immediately ratify the IEA. Thus, IEA-ratification uniquely ties the hands of constitutionally unconstrained authoritarian leaders with high industry dependence to provide compensation ex-post to ratification. For these regimes, IEA-ratification thereby signals to industry owners that an autocrat's compensation-commitments are credible, which compels industry owners to cut back on the actual capital that they invest to remove the autocrat. Recognizing this, it becomes rational for weakly constitutionally constrained authoritarian regimes to ratify IEAs, and for industries to acquiesce to this decision. In essence, these dynamics arise because while IEAs do not systematically impose costs on all members for all IEA violations, they can ensure that member states incur costs when they renege on specific IEA-related commitments to domestic (brown) industries. This guarantees that—when undertaken in conjunction with an autocrat's promises of compensation to industry owners—immediate IEA ratification will serve as a costly signal of these commitments for weakly constrained autocracies with high industry dependence.

Therefore, the unique separating equilibrium result generated by the signalling model described above predicts that weakly constitutionally constrained autocrats that face powerful industry demands will be more likely to successfully and quickly resolve their strategic problems with industry owners, leading to quicker IEA-ratification. On the other hand, the model also suggests that constitutionally constrained autocracies lack the ability to credibly commit to compensation-provision via IEA-ratification, giving these leaders—and industry owners—the incentives to delay the ratification of these agreements. Here, high constitutional constraints reveal, albeit imperfectly, information to brown industry owners that the autocrat has greater (domestic) political incentives to follow through on its promise and provide compensation to owners. This screening mechanism thereby reduces the incentives for constrained autocrats to incur the transaction costs associated with immediate IEA-ratification and provides a viable alternative for making credible promises to industry owners. These features, together with the

heightened IEA-ratification costs that arise as industry size (via compensation allotments) and constitutional constraints expand, work to ensure that highly constrained autocrats will become less likely to expeditiously ratify IEAs as their industry dependence increases

Taken together, these propositions suggest an interactive relationship between (i) constitutional constraints and (ii) brown industry dependence in their impacts on the speed of authoritarian IEA-ratification; wherein the causal effects of brown industry dependence on authoritarian incentives to ratify such an agreement are moderated by that authoritarian government's levels of constitutional constraints, and vice-versa. These dynamics lead to the following testable hypotheses, which I evaluate empirically below:

Hypothesis 1: *Industry dependence increases the speed of IEA-ratification under unconstrained autocracies*

Hypothesis 2: *Industry dependence decreases the speed of IEA-ratification under constrained autocracies*

3.2 Analysis

To test these hypotheses, I examine the patterns of global IEA ratification among authoritarian governments for the years 1972-2010. The unit of analysis for the sample is the IEA-autocracy-month, and encompasses all authoritarian governments in the world with available data. A country-month was coded as authoritarian and included in the sample based upon the binary democracy-autocracy classification (and corresponding criteria) outlined in (7). The sample then pairs each authoritarian regime with 15 separate global IEAs for the year-months during which an IEA was globally available for ratification or accession and codes the duration of time (in months) taken until ratification or accession by each resultant autocracy-IEA pair, which I refer to hereafter simply as "ratification." The rational for including a set of (only) 15 prominent, global IEAs is that—unlike many IEAs such as, e.g., the Convention for the Conservation of Antarctic

Seals—these major IEAs generally call-for autocrats to enact at least some degree of actual domestic regulation or policy-change in areas detrimental to the interests of industry.

I use four main criteria to determine *which* global IEAs to include in the sample. First, due to data availability, an IEA had to be established after the year 1970 to be included. Second, an IEA had to be truly *global* in scope; in the sense that it addressed an environmental concern of—and was open to—all countries in the world, rather than a specific region. Third, those global IEAs that met the first two criteria were only included in the sample if there was a general consensus among both researchers and policymakers that an IEA truly had global relevance. The sources used to assess this consensus included (i) the United Nations Environment Program's list of "Major Environmental Treaties" (245), (ii) the IEAs considered to have a sufficiently high levels of activity, membership, and global relevance to be included as cases within ENTRI's Conference of Parties (COP) database (246), and (iii) the IEAs included in recent empirical samples of major environmental treaties (48, 70, 105, 247). Fourth, a globally relevant IEA then had to exhibit evidence, via its convention-texts, objectives, scope, rules, or obligations, of requiring members to undertake regulation that directly or indirectly harmed the economic interests of domestic industry.

These ex-ante guidelines led to the selection of major global IEAs such as the Montreal Protocol and the Convention on Biological Diversity, while avoiding (i) any selection on my dependent variable or (ii) the inclusion of IEAs that had no relevance to autocracies or industry in scope or membership-requirements. The 15 IEAs that were ultimately included in the sample are listed—along with a selection of the domestic industries that they potentially threaten—in Table 3.1 below.

Table 3.1: Global IEAs Included in Sample

International Environmental Agreement	Established	Affected Industries
Basel Convention (Hazardous Wastes)	03-22-1989	chemical, petroleum & gas, mining, electricity, manufacturing
Convention on Biological Diversity	06-05-1992	pharmaceutical, biotechnology, food-processing
Convention to Combat Desertification	10-14-1994	water, construction, mining, logging & wood-based (e.g., paper)
Convention on International Trade in Endangered Species	03-03-1973	textile & apparel, logging & wood-based, construction
Convention on the Conservation of Migratory Species	06-23-1979	logging & wood-based, chemical, manufacturing, petroleum & gas
Kyoto Protocol (Climate Change)	12-11-1997	electricity, logging & wood-based, petroleum & gas, manufacturing
United Nations Convention on the Law of the Sea	12-10-1982	(deep-sea) mining, petroleum & gas, manufacturing, shipping
International Convention for the Prevention of Pollution From Ships	02-17-1973	petroleum & gas, shipping, ship-building
Montreal Protocol on Substances That Deplete the Ozone Layer	09-16-1987	chemical, pharmaceutical, manufacturing, food-processing
The Ramsar Convention on Wetlands	02-02-1971	mining, petroleum & gas, logging & wood-based, electricity
Stockholm Convention on Persistent Organic Pollutants	05-23-2001	chemical, construction, manufacturing
UN Framework Convention on Climate Change	05-09-1992	electricity, logging & wood-based, petroleum & gas, manufacturing
UN Convention on Protection of World Cultural & Natural Heritage	11-21-1972	petroleum & gas, logging & wood-based, mining, water, construction
Vienna Convention for the Protection of the Ozone Layer	03-22-1985	chemical, pharmaceutical, manufacturing, food-processing

My hypotheses contend that weakly constitutionally constrained authoritarian countries will ratify IEAs more quickly as their industry dependence increases; while highly constrained autocrats will instead choose to delay ratification as industry dependence increases. To test these hypotheses, I must assess authoritarian countries' decisions to quickly ratify—or delay ratification of—each of the 15 IEAs presented above. Hence my primary interest is in the *length* of time that it takes each country to join an IEA, rather than whether authoritarian countries ultimately decide whether to ratify or not ratify these agreements. Consistent with existing studies of international agreement ratification or international agreement demand (e.g, 33, 47, 48, 65), the dependent variable for this chapter is therefore best characterized as the time-taken until an authoritarian government's IEA ratification.

Accordingly, I employ a survival model framework to analyze the effects of my covariates on autocracies' IEA membership decisions, which—for the reasons listed above—has become the norm in country (or regime) level studies of international treaty ratification (33, 47, 48, 65, 69, 248). In using survival models, I chose to examine ratification-months as my main unit of temporal variation. To do so, I create a novel country-IEA-month dataset encompassing the 15 IEAs described above, all authoritarian countries of interest, and—for each IEA-autocracy pair—all relevant months within the 1972-2010 time frame.[1] Monthly ratification data allow me to take into account the rich temporal variation in autocracies' ratification-delays, which is both useful and relevant information on state-preferences and calculuses towards IEA-membership (48, 254). Nevertheless, I employ a series of robustness tests further below to demonstrate that my findings do not rest on the large number of observations that monthly units-of-analysis entail.

In addition to maximizing the variation in treaty ratification, the choice of monthly—rather than yearly—ratification-spells helps to minimize the adverse effects of event ties on several of the survival-models that are employed below and is consistent with the most recent research on international treaty ratification (48,

[1]Sources used to code this data include ENTRI's Multilateral Environmental Treaty Database (249) and the official treaty-websites and archives for each of the 15 IEA's listed in Table 3.1.

65, 248, 250). In order to avoid making any problematic parametric assumptions, I use Cox proportional hazard models (251) in my primary analyses. For these models, Schoenfeld residuals indicated that one could not reject proportionality assumptions, and hence Cox proportional hazard models were favored over their nonproportional counterparts. In the robustness section below I also demonstrate that my findings are robust to estimations that rely upon alternative, parametric survival assumptions.

Because my theory suggests that the effect of constitutional constraints on authoritarian ratification behavior is dependent upon an authoritarian leader's industry-dependence, I must create and interact two separate independent variables to test my hypotheses. The first is *Constitutional Constraints*, which captures the level of de-facto constitutional constraints on the decision making powers of a country's (individual or collective) chief executive(s) (111). To operationalize *Constitutional Constraints*, I use the Polity IV Project's seven-point ordinal *xconst* variable, which I re-code to range from $0-6$ to ease interpretation.[1] The lowest categories of *Constitutional Constraints* (0 or 1) correspond to the most constitutionally-unconstrained authoritarian regimes, such as those with no de-facto limitations on an executive's actions;[2] while the highest categories of executive constraints (5 or 6) correspond to autocracies that exhibit executive constitutional constraints comparable to those found within democracies.[3]

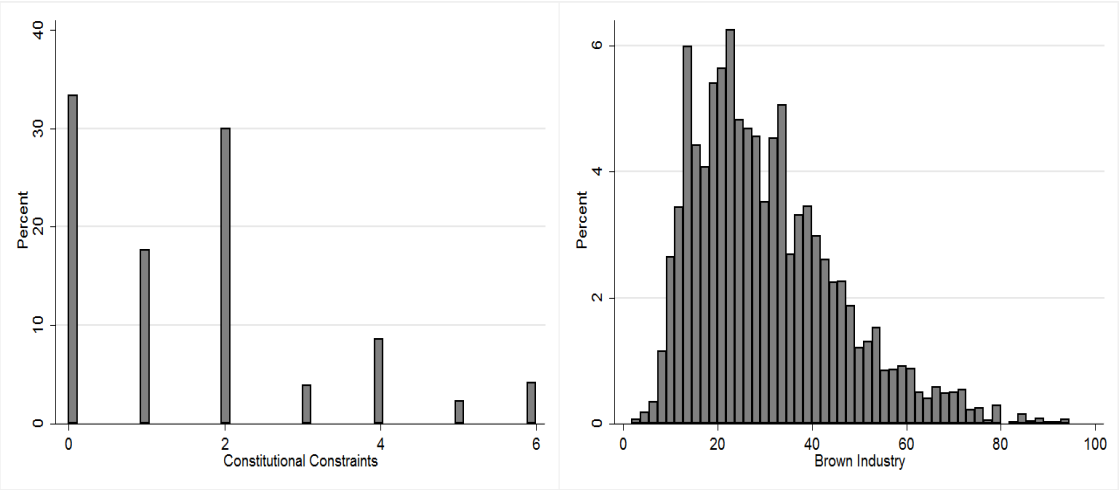
Second, to measure an authoritarian government's dependence on industry, I operationalize (the one-year lag of) *Brown Industry* dependence as an authoritarian country's domestic industry net-output as a percentage of GDP. This measure encompasses all major sectors of "industry," including mining, manufacturing, construction, electricity, water, and gas (178). For the authoritarian observations in my sample, *Brown Industry* ranges from approximately $2\%-94\%$ with a mean of roughly 32%. A complete list of the industries included in *Brown Industry* appears in Table 3.2 and the distributions of *Brown Industry* and *Constitutional Constraints* are reported in Figure 3.1. Finally, to fully test the above

[1] My results are robust to a dichotomized version of this measure as well.

[2] For example, cases where constitutional restrictions on executive action are ignored; constitution frequently revised or suspended by executive; or rule by decree repeatedly used (111).

[3] For example, cases where legislatures often modify or defeat executive proposals; or executives are chosen by—and dependent upon—accountability groups to remain in office (111).

hypotheses, the product of the two aforementioned independent variables (*ConstraintXLagIndustry*) is also taken and included in the analysis.



(a) Histogram: *Constitutional Constraints* **(b)** Histogram: *Brown Industry*

Figure 3.1: Distributions of Independent Variables, 1972-2010

While *Brown Industry* and *Constitutional Constraints* are slow moving, they nevertheless exhibit a substantial amount of temporal variation. On average, the (1972-2010) *within*-country standard deviations for *Brown Industry* and *Constitutional Constraints* are 4.92 and 0.91, indicating that the *typical* autocracy exhibits temporal changes in *Brown Industry* and *Constitutional Constraints* that amount to 5% and 15% of each variable's entire sample-range, while several autocracies vary by as much as 30-48%. To see this heuristically, Figure 3.2 presents the temporal variation in *Brown Industry* and *Constitutional Constraints* via time series plots for two typical authoritarian countries: Zimbabwe and Jordan. Recalling that the range of *Constitutional Constraints* is 0-6, one can note in Figure 3.2 that Zimbabwe declines from a high of 6 to a low of 1 on *Constitutional Constraints* across the 1972-2010 period, whereas Jordan's constraints grow over this same period from a low of 0 to a high of 2, in each case a non-negligible level of temporal change. Similarly for *Brown Industry*, we find in Figure 3.2 that each country exhibits temporal variation that encompasses a sizable portion of *Brown Industry*'s entire sample range.

Table 3.2: Industries Included within *Brown Industry* Measure

ISIC Code	Description
10	Mining of coal & lignite; extraction of peat
11	Crude petroleum and natural gas extraction; incidental extraction services
12	Mining of uranium & thorium ores
13	Mining of metal ores
14	Other mining and quarrying
15	Manufacture of food products & beverages
16	Manufacture of tobacco products
17	Manufacture of textiles
18	Manufacture of apparel; dressing and dyeing of fur
19	Tanning of leather; manufacture of luggage, handbags, saddlery, & footwear
20	Manufacture of wood and of products of wood & cork
21	Manufacture of paper and paper products
22	Publishing, printing and reproduction of recorded media
23	Manufacture of coke, refined petroleum products and nuclear fuel
24	Manufacture of chemicals & chemical products
25	Manufacture of rubber & plastics products
26	Manufacture of other non-metallic mineral products
27	Manufacture of basic metals
28	Manufacture of fabricated metal products
29	Manufacture of machinery & equipment
30	Manufacture of office, accounting & computing machinery
31	Manufacture of electrical machinery
32	Manufacture of radio, television & communication equipment
33	Manufacture of medical, precision & optical instruments, watches & clocks
34	Manufacture of motor vehicles, trailers and semi-trailers
35	Manufacture of other transport equipment
36	Manufacture of furniture
40	Electricity, gas, steam & hot water supply
41	Collection, purification & distribution of water
45	Construction

Source: International Standard Industrial Classification of All Economic Activities, Rev.3.1 (`http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=17`).

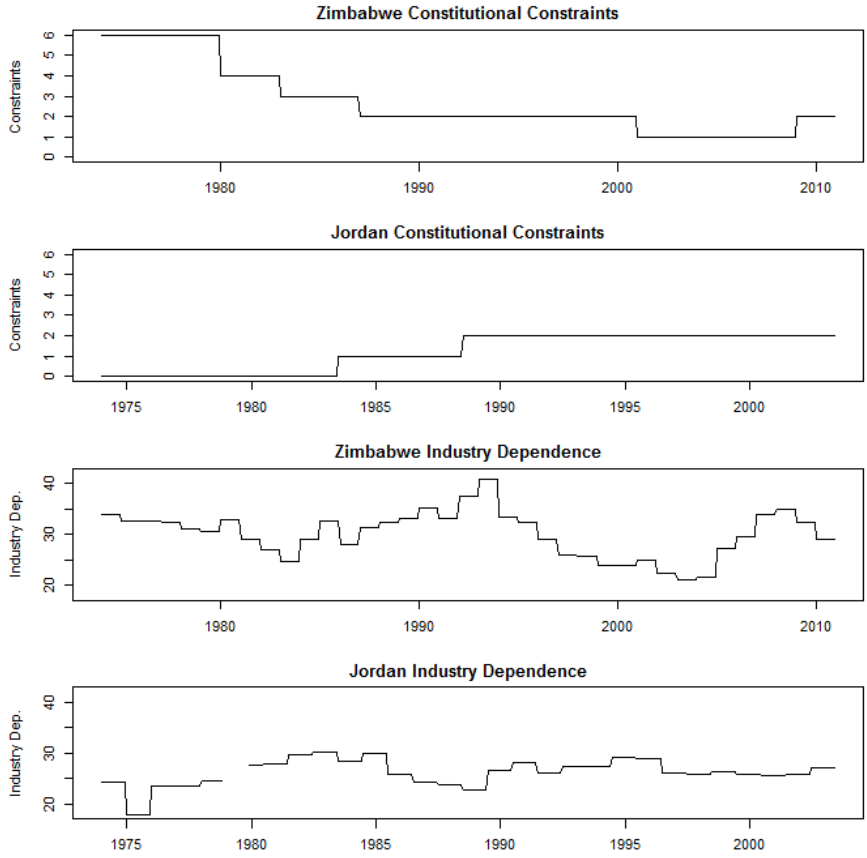


Figure 3.2: Time Series Plots of Independent Variables - *Brown Industry* and *Constitutional Constraints*

In addition to these independent variables, the models presented below also include a number of political controls. Scholars have reported a high degree of correspondence between a country's Polity score—which is often treated as an aggregate measure democracy—and *Constitutional Constraints* (252), which itself is a key component of Polity (111). To ensure that *Constitutional Constraints* is actually capturing the theoretical construct of interest, rather than democratic institutions or civil liberties more generally, I add the other key Polity component variables as controls. Specifically, I include ordinal variables coded by the Polity IV project (111) to capture a country's levels of *Constitutional Competitiveness*, competitiveness of political participation (*Parcomp*) and regulation of political participation (*Parreg*). Additionally, some authoritarian national legislatures may hold de jure authority to ratify international treaties. If abided by, this authority could affect the timing of treaty ratification (69) and may potentially correlate with *Constitutional Constraints*. The primary specifications below therefore include a binary indicator of whether (or not) a national legislature has de jure treaty ratification authority as a control.[1]

Autocrats with short time horizons may choose to ignore constitutional constraints, industries' property-rights, and environmental quality (102, 215) and accordingly, I control for an autocrat's time horizon using a running count of past regime failures (*Time Horizon*).[2] Because authoritarian regime types have also been shown to influence (i) autocrats' decisions to implement domestic constraints (165), (ii) autocrats' valuations of private and public goods (165, 166) and (iii) autocratic management of environmental policy (163), I also include fixed-effects for each of the 10-fold authoritarian regime type classifications defined in (179, 255). In addition to these domestic factors, the ratification decisions of other (nearby) states may also play a role in governments' decisions to ratify IEAs (48). Therefore, for each autocracy-IEA-month, I control for an IEA's ratification rate among all other countries within an authoritarian country's home-region, lagged by one month.

A country's demographic and geographic environment may also influence authoritarian valuations of environmental quality and industry (256), and I therefore

[1] Coded from (253) and (254).
[2] Taken from (179).

also include covariates measuring each autocratic country's total (logged) *Land Area* and *Population Density*. These controls, as well as all economic controls discussed below are taken from the World Bank's World Development Indicator's dataset (178). National wealth and economic performance have been widely argued to affect countries' commitments to environmental quality (257, 258) and—through their effects on capacity and factor endowments—likely also affect autocracies' levels of *Constitutional Constraints* and *Brown Industry*. Thus, I control for a country's *log GDP per capita*, its squared term (to account for the Environmental Kuznets Curve) and *Annual GDP Growth*.

An autocracy's dependence on non-taxable sources of revenue—such as natural resource rents—has been found to increase the likelihood of personalist rule and hence the probability of low constitutional constraints (165, 324), which leads me to control for these alternate sources of revenue by including covariates measuring each autocratic country's natural resource revenue (*Resource Dependence*) and foreign direct investment (*FDI*) as shares of GDP. Indeed, while most "natural resource" industries fit well within my causal story—and within my measure of *Brown Industry*—it is important to establish that any findings thereof are not entirely being driven by high-levels of natural resource rents; which are likely to be highly correlated with high levels of *Brown Industry*. Similarly, I control for (logged) *Investment Dependence* (Net investment as a share of GDP; 259) in my models below to ensure that my measure of industry dependence is not simply proxying for high levels of domestic investment, which is known to be influenced by authoritarian institutional constraints (165, 166).

For many authoritarian governments, trade policy and (post) cold-war dynamics have helped to shape (i) the adoption of 'democratic' institutional constraints (165, 260, 331), (ii) environmental performance (261) and (iii) state-industrial relations (262, 263). I therefore add controls for both *Trade Dependence* (trade as a share of GDP) and the *Cold War* era. Finally, I include region-level fixed effects, IEA-specific fixed effects, and robust standard errors in my final models below in order to account for the non-independent and heterogenous nature of my observations' rates of ratification across different geographic regions and IEAs. Region and IEA random effects models were also estimated and were found to provide substantively comparable results to those presented below.

3.2.1 Results

The main hazard model results for autocratic IEA-ratification are presented in Table 3.3. For this table, I begin with a baseline specification and then sequentially add in additional controls and sets of fixed-effects to arrive at my full model specification (Model 4). Specifically, Model 1 presents the estimated effects of my key independent variables in isolation. Model 2 adds to this specification a number of key controls, as well as region and IEA fixed effects. Models 3 and 4 add several additional controls as well as fixed effects for the aforementioned 10-fold authoritarian regime type classifications, to ultimately arrive at my full specification (Model 4). Table 3.3 then reports the hazard ratios—wherein a hazard ratio > 1 implies a positive effect on a observation's likelihood of treaty ratification, a hazard ratio of one corresponds to no effect, and a hazard ratio < 1 implies a negative effect—and significance levels for my key independent and control variables of interest. These hazard ratios—as well as joint significance tests—indicate that *Constitutional Constraints*, *Brown Industry*, and *ConstraintXIndustry* each have statistically significant effects on an autocrat's time taken to IEA-ratification at least at the $p < 0.05$ level across all four models.

While I withhold full interpretation of these independent variables' effects until deriving and presenting their combined substantive effects below, one can note here, for instance, that the hazard ratio for *Brown Industry* is greater than one, which implies that when *Constitutional Constraints* is equal to zero (i.e. when an autocrat is wholly unconstrained), higher levels of *Brown Industry* lead autocracies to ratify IEAs more quickly, which is in support of Hypothesis 1. Aditionally, several controls have theoretically consistent and statistically significant hazard ratios in Table 3.3. Of particular note, *Executive Competitiveness* and *Regional Ratification* are found to increase the speed of autocratic treaty ratification, while *Resource Dependence* is found to delay ratification—all in line with the theoretical expectations presented above as well as with extant theory and findings (48, 264). Lastly, *Investment Dependence* is also found to accelerate IEA-ratification, perhaps suggesting that autocrats with high valuations for one type of public good (public and private investment) are also more likely to value others (such as environmental quality).

Table 3.3: Main Models: Authoritarian IEA Ratification

	Model 1	Model 2	Model 3	Model 4
Const. Constraints	1.384***	1.329***	1.371***	1.396***
	(0.068)	(0.082)	(0.110)	(0.114)
Indust Dependence	1.008***	1.012**	1.021***	1.018***
	(0.003)	(0.005)	(0.008)	(0.008)
ConstraintXIndustry	0.997**	0.997**	0.995***	0.994**
	(0.01)	(0.002)	(0.002)	(0.002)
Exec. Competitiveness		1.118**	1.425***	1.392***
		(0.092)	(0.164)	(0.167)
Parreg		1.099	0.912	0.938
		(0.074)	(0.093)	(0.017)
Parcomp		1.151***	0.966	0.983
		(0.060)	(0.077)	(0.084)
GDP pc		1.010	0.982	2.002
		(0.045)	(0.060)	(0.922)
Trade Dependence		0.998***	0.999	0.998
		(0.001)	(0.001)	(0.002)
Time Horizon			1.103	1.104
			(0.057)	(0.060)
Log Land Area			1.031	1.049
			(0.037)	(0.044)
Resource Dependence			0.987***	0.989***
			(0.004)	(0.004)
GDP growth			0.996	0.987*
			(0.007)	(0.008)
Cold War			0.821	0.909
			(0.137)	(0.163)
Population Density				1.000
				(0.0001)
FDI				1.001
				(0.010)
GDP pc squared				0.951
				(0.032)
Invest Dependence				1.015***
				(0.005)
Regional Ratification				2.350***
				(0.531)
Leg. Treaty Approval				1.018
				(0.137)
Observations	134,193	97,637	82,015	74,674
ll	-7235	-4916	-3357	-3121

Note: Reported values are hazard rates with robust standard errors in parentheses. IEA & Region FE's included in Models 2-4. Authoritarian regime-type FE's included in models 3-4.
*** p<0.01, ** p<0.05, * p<0.1

To gain a better sense of the *net* effects of *Constitutional Constraints*, *Brown Industry*, and *ConstraintXIndustry*, as well as to assess whether models 1-4 ultimately support my hypotheses, I next extract and present a series of substantive effects graphs using the estimates from model 4. These substantive effects were calculated for various values of *Constitutional Constraints* and *Brown Industry* while holding all controls at their means or modes. For the figures presented below, I specifically compare the survival curves for IEA-ratification among constitutionally unconstrained and constitutionally constrained authoritarian countries; given two levels of *Brown Industry*: 15% and 50% net industry output as a share of GDP. These percentages correspond to *Brown Industry* levels set at approximately one standard deviation below and one standard deviation above the mean for my autocracy sample; and can therefore be thought of as "low" and "high" degrees of industrial dependence. Figure 3.3 overlays these four points-of-comparison graphically, along with my IEA-ratification expectations for each, upon a scatterplot of *Constitutional Constraints Brown Industry*, so as to demonstrate that I have observational support for each of my points-of-comparison within my actual sample. Examples of authoritarian countries in my sample with industry output at 15% total GDP are contemporary Kenya, Myanmar, and Nepal; or Panama under Noriega, whereas examples of autocrats exhibiting roughly 50% industry output per-GDP can be found in contemporary Botswana, Turkmenistan, or China; or during Communist Hungary.

Figure 3.4 below presents survival curves for autocratic treaty ratification under these two (high and low) levels of *Brown Industry* within both unconstrained autocracies (Figure 3.4a) and constrained autocracies (Figure 3.4b). In reporting "survival" on the y-axis, these graphs present the probability that a specific country *does not* ratify a given IEA at a particular point in time, given the passage of a certain number of months following the IEA's being made available for ratification (x-axis). Beginning first with Figure 3.4a, one can thereby see that that—for any point in time—the predicted likelihood of IEA *non-ratification* is higher for unconstrained autocracies with *low* industry dependence than it is for unconstrained autocracies with *high* industry dependence. Hence, the time-taken to ratification (in months) for unconstrained authoritarian regimes with high industry dependence is significantly lower than the time taken to ratification by

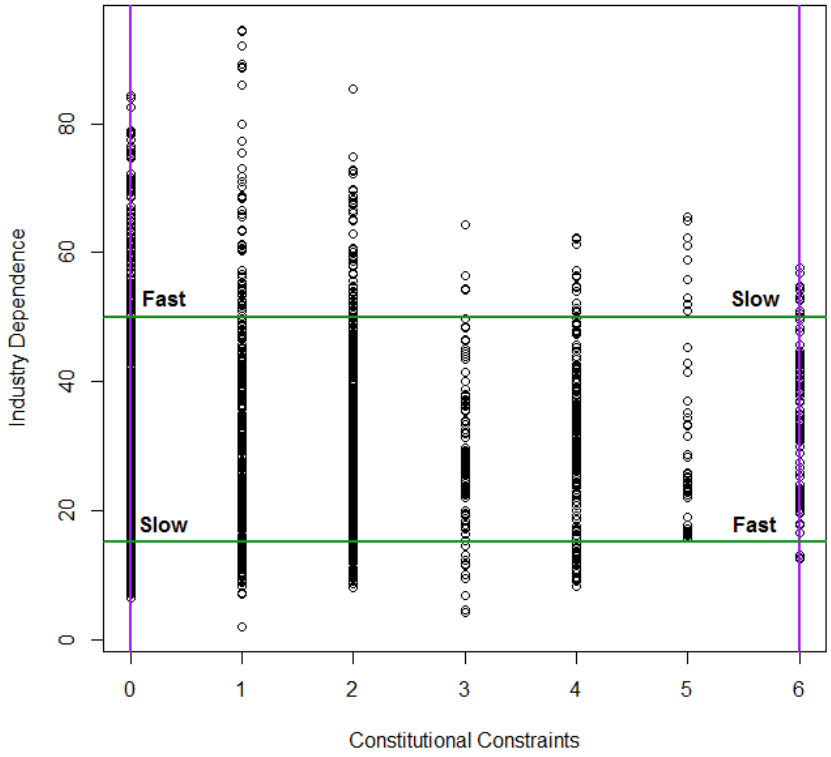


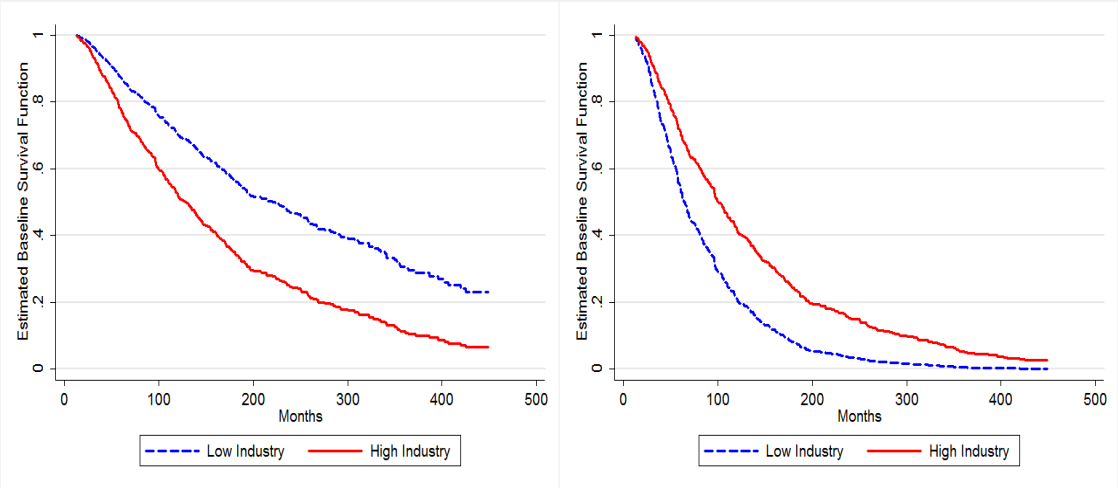
Figure 3.3: Scatterplot of Independent Variables - *Brown Industry* and *Constitutional Constraints*

unconstrained authoritarian regimes with low levels of industry dependence, in support of Hypothesis 1. Indeed, for the mean level of months taken to ratification in my sample (approximately 100), Figure 3.4a indicates that constitutionally unconstrained authoritarian regimes with high industry dependence are 20% more likely to ratify an IEA than are their low-industry dependent counterparts.

Figure 3.4b demonstrates that the above finding—of high industry dependence increasing an autocrat's likelihood of IEA ratification—uniquely holds for *unconstrained* authoritarian regimes. Specifically, Figure 3.4b compares the same two levels of industry dependence as reported above, but now for constitutionally *constrained* authoritarian regimes. In this case, we can note that high *Brown Industry* dependence now extends—rather than decreases—the time taken to treaty ratification among this subset of authoritarian countries. In particular, Figure 3.4b suggests that for a typical level of months-till-ratification (100), constrained autocracies with high industry dependence will be 20% *less* likely to ratify an IEA, relative to comparable autocracies with low industry dependence. This result provides support for Hypothesis 2, which posited that increases in industry dependence should compel highly constrained autocracies to delay IEA-ratification, relative to the ratification patterns of constitutionally constrained autocracies with low brown industry dependence. Hence, and in support of the hypotheses presented above, Figure 3.4 suggests that increases in *Brown Industry* (uniquely) compel *unconstrained* autocracies to seek-out IEA membership, and hence to ratify IEAs more quickly.

3.2.2 Robustness Models

The findings presented above are robust to the inclusion or exclusion of potential outlying observations and cases. DFbeta scores were calculated using the model specification presented in Model 4 above, and observations returning extreme DFbeta values were then excluded from a subsequent re-analysis of Model 4. Doing so had no effect on the robustness of the main results. *Brown Industry* is relatively normally distributed, and hence not severely skewed. Nevertheless, a careful examination of the countries included within the first and tenth deciles of *Brown*



(a) Unconstrained Authoritarian Regime **(b)** Constrained Authoritarian Regime

Figure 3.4: Effect of Industry-Dependence on IEA Ratification

Industry indicates that these extreme-cases tend to be predominately small Sub-Saharan African countries and natural resource (primarily oil) mono-exporters, respectively. Controlling for region, *Log Land Area* and *Natural Resource Dependence* in Table 3.3 suggests that these cases alone are not driving my primary findings. However, to further ensure that extreme (high or low) values of *Brown Industry* are not primarily responsible for the above results, I re-ran Model 4 after dropping countries with levels of *Brown Industry* less than 10% or greater than 80%, and found that my results remained unchanged.

To determine whether my results were being driven by the inclusion of a particular IEA, 15 additional models were run while dropping each IEA one at a time. Across all 15 of these models, *Constitutional Constraints*, *Brown Industry*, and *ConstraintXIndustry* remain statistically significant in the directions reported in Table 3.3. Simultaneously dropping the two "framework" conventions in the dataset: the Vienna Convention and the UNFCCC, also does not alter the significance of the above results. The use of monthly data above, rather than yearly or quarterly data, helps to reduce the number of tied events in my sample. Nevertheless, tied events do arise, and the Cox proportional hazard results reported above remain robust when ties are addressed via Breslow's (265) approximation, Efron's (266) approximation, or "exact" methods.

Historically, many prominent brown industries in developing countries (e.g., oil and gas companies) have been government owned (267), and my *Brown Industry* measure does not distinguish between state-owned and privately-owned industries. Furthermore, one could argue that state-owned enterprises do not precisely fit the formal model presented in Chapter 2, since in cases where industries are owned by the government itself, (i) industry owners and autocrats could be the same exact individuals and (ii) even when they are different individuals, state industry owners may lack the ability to credibly threaten to remove an autocrat from power. Authoritarian-country evidence suggests, however, that such concerns are likely overstated. In many authoritarian countries, owners of *nationalized* industries are distinct from autocratic heads-of-state, as direct control of state-owned industries is often dispensed to military officials,[1] provincial administrators,[2] or bureaucratic technicians,[3] rather than the autocrat itself or any immediate family.

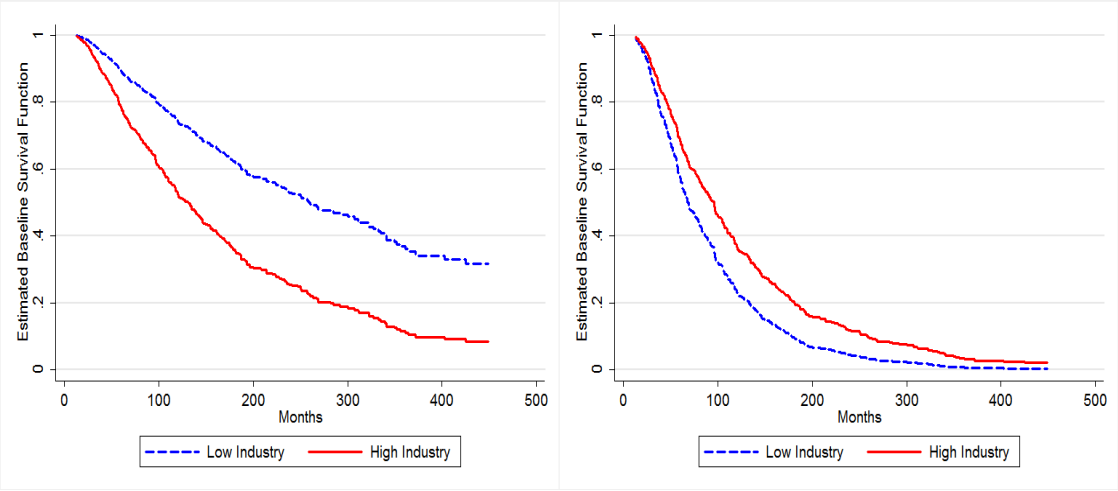
In these cases of decentralized state-ownership, there exists ample evidence to suggest that the preferences of state industry owners and autocrats can diverge, and that when they do, industry owners will often (attempt to) remove autocrats from power. For instance, the Egyptian military owns significant portions of Egypt's economy and industry (274), and recently took an active role in ousting Hosni Mubarak from power (274, 275, 276), in addition to blocking Mubarak's son from succeeding him in office (277, 278), and actively planning to

[1]For example, Robinson notes that Indonesia's major state owned industries were controlled by the military since the time of their nationalization, wherein "The economic function of the military men running these enterprises was to generate finance for the political survival of factions, families, and even governments." (268, 25). Many study given mention to the military's ownership role of state-owned industries within China, and suggest that even this form of decentralized state ownership has given way to civilian ownership in recent decades (e.g., 269, 270, 271).

[2]In China, for instance, Montinola, Qian and Weingast argue that "[t]he modern Chinese system includes a division of authority between the central and local governments. The latter have primary control over economic matters within their jurisdictions" (272, 53-54), which they go on to argue includes Chinese state-owned industries (272, 63-65).

[3]See Trebat for discussion of the Brazilian military dictatorship's usage of technocrats (via alliances) to administer the country's major state owned industries in the areas of steel, petroleum, and petrochemical production (273, 42). Nolan and Xiaooiang similarly note that in China, many major state owned industries are now administered under a contract system, "with strong managers allowed a high degree of autonomy in return for fulfillment of the contracted 'left-overs' " (271, 187).

remove Mubarak before the 'Arab Spring' revolutions even began (279). Similar opposition from state-based oil industry owners contributed to an attempted coup d'état against Venezuelan leader Hugo Chavez in 2002, spurring Chavez to clean house and remove many of the state's oil industry managers and technocrats.[1] One exception to this claimed divergence in state-industry-owner and autocratic leader preferences, however, likely lies within monarchies, where state industry ownership is often directly vested in the hands of other members of the royal family.[2] Hence, I preform an additional robustness test where I drop all monarchies,[3] re-run my primary analysis, and report a new set of marginal effects—now with monarchies removed—in Figure 3.5 below. As one can see in these results, my principal findings remain even after monarchies have been removed from the sample.



(a) Unconstrained Authoritarian Regime **(b)** Constrained Authoritarian Regime

Figure 3.5: Effect of Industry-Dependence on IEA Ratification (Monarchies Removed)

To further evaluate the sensitivity of the above findings, I subjected my results

[1] "Everything began to change at PDVSA after Mr Chávez's opponents led an industry strike in December 2002. Having failed to remove him in a coup d'état that April, the strike lasted two months, crippling the economy. Afterwards, Mr Chávez cleaned out PDVSA, sacking about 20,000 employees — many of them among its best technicians and managers" (175).

[2] Such as in the Gulf States (280, 281), and Morocco (282, 17).

[3] As defined by (179, 255).

to six additional tests. These additional specifications appear in Table 3.4 below. Following extant research on IEA-ratification (e.g., 48), the first robustness model in Table 3.4 adds year fixed-effects to my main model specification in order to better account for temporal dynamics and temporally-correlated clustering in the data. As one can see, the inclusion of year fixed-effects does not affect the robustness of my findings, and in fact appears to improve the strength of these findings both statistically and substantively. The third and fourth models in Table 3.4 re-estimate my main model specification from Table 3.3 using exponential and Wiebull parametric survival models, respectively, and demonstrate that doing so also does not affect the robustness of my main results.

Finally, while monthly data has recently gained prominence in studies of international treaty ratification (48, 65, 248, 250), it is possible that this fine grained level of analysis—while maximizing variation and minimizing the harm done to Cox proportional hazard analysis by tied-events—may also be inflating the significance of the above results through the large number of observations that monthly data entail. To address these concerns, the fourth model in Table 3.4 randomly samples 20% of the country-IEA pairs in my authoritarian-sample, and demonstrates that the above findings hold for models using this considerably smaller data set. Alternatively, the final two robustness models in Table 3.4 collapse the full monthly data set into quarterly data, and replicate the primary analysis at the quarterly level. Doing so significantly increases the number of event ties by as much as a factor of four, and hence I report the quarterly results when using both (i) a Cox proportional hazard model and (ii) a Wiebull parametric survival model. Turning to these quarterly models, we can note that *Constitutional Constraints*, *Brown Industry*, and *ConstraintXIndustry* all remain statistically significant in directions consistent with Hypotheses 1 and 2.

3.3 Conclusion

This chapter tests the proposition that *some* authoritarian governments have incentives to pursue international environmental agreements (IEAs) as a means of making credible commitments to domestic industries whereas others do not. To

Table 3.4: Robustness Models: Authoritarian IEA Ratification

	Year-Fixed Effects	Exp. Hazard	Weibull Hazard	Random Sample	Quarterly Cox	Quarterly Weibull
Const. Constraints	1.395***	1.398***	1.421***	1.467**	1.428***	1.431***
	(0.119)	(0.111)	(0.114)	(0.254)	(0.138)	(0.127)
Indust Dependence	1.022***	1.018**	1.019**	1.052***	1.014*	1.017**
	(0.008)	(0.008)	(0.008)	(0.170)	(0.008)	(0.008)
ConstraintXIndustry	0.994***	0.994***	0.994***	0.991**	0.995**	0.995**
	(0.002)	(0.002)	(0.002)	(0.004)	(0.002)	(0.002)
Exec. Competitiveness	1.444***	1.345**	1.371***	1.486	1.402***	1.435***
	(0.176)	(0.158)	(0.165)	(0.396)	(0.181)	(0.185)
Parreg	0.952	0.904	0.940	0.744	0.943	0.985
	(0.104)	(0.101)	(0.105)	(0.159)	(0.105)	0.108
Parcomp	1.006	0.975	0.991	0.934	0.961	0.994
	(0.083)	(0.082)	(0.085)	(0.162)	(0.082)	(0.089)
log GDP pc	1.828	1.876	2.089	8.842**	2.815**	2.138
	(0.836)	(0.859)	(0.975)	(9.785)	(1.377)	(1.058)
Trade Dependence	0.997	0.998	0.998	0.994*	0.998	0.998
	(0.002)	(0.002)	(0.002)	(0.004)	(0.002)	(0.002)
Time Horizon	1.108*	1.097*	1.104*	0.931	1.121*	1.133*
	(0.059)	(0.058)	(0.060)	(0.127)	(0.072)	(0.072)
Log Land Area	1.046	1.047	1.043	0.857	1.054	1.048
	(0.043)	(0.043)	(0.044)	(0.083)	(0.045)	(0.049)
Resource Dependence	0.986***	0.990**	0.989***	0.983**	0.995	0.994
	(0.004)	(0.004)	(0.004)	(0.008)	(0.004)	(0.004)
GDP Growth	0.989	0.988	0.987	0.994	0.981**	0.979**
	(0.008)	(0.008)	(0.008)	(0.016)	(0.008)	(0.008)
Cold War		1.010	1.146	1.512	0.805	0.990
		(0.153)	(0.177)	(0.587)	(0.133)	(0.155)
Population Density	1.000	1.000	1.000	1.000	1.000	1.000
	(0.0001)	(0.0001)	(0.0001)	(0.004)	(0.001)	(0.001)
FDI	1.006	0.999	1.000	0.989	0.990	0.996
	(0.010)	(0.010)	(0.010)	(0.024)	(0.011)	(0.011)
GDP pc squared	0.961	0.956	0.948	0.843**	0.927**	0.943
	(0.032)	(0.032)	(0.032)	(0.062	(0.032)	(0.034)
Invest Dependence	1.014***	1.014***	1.015***	0.995	1.016***	1.016***
	(0.005)	(0.005)	(0.005)	(0.012)	(0.005)	(0.005)
Regional Ratification	2.698***	3.752***	2.420***	3.973**	2.614***	1.744***
	(0.636)	(0.638)	(0.539)	(2.203)	(0.599)	(0.359)
Leg. Treaty Approval	1.038	0.997	1.014	0.848	0.992	1.063
	(0.143)	(0.132)	(0.137)	(0.235)	(0.142)	(0.161)
Observations	74,674	74,674	74,674	14,425	25,003	25,003
ll	-3085	-625	-620	-462	-2133	-888

Note: Reported values are hazard rates with robust standard errors in parentheses. Authoritarian regime-type, IEA, and Region fixed effects included in all models. *** p<0.01, ** p<0.05, * p<0.1

do so, the introduction of this chapter proposed two testable hypotheses. The first stated that authoritarian regimes with high levels of industry-dependence and low levels of constitutional constraints will seek-out IEAs to tie their hands and and credibly signal to domestic industry that they are committed to providing compensation to industry owners. The second hypothesis proposed, conversely, that authoritarian regimes with high constitutional constraints will instead respond to higher industry dependence with slower ratification; relative to constrained autocracies with low industry dependence.

Examining a dataset of authoritarian treaty ratification behaviors vis-à-vis the 15 most prominent global IEAs erected during the post-WWII era, I find strong support for these hypothesis. Specifically, survival analyses indicate that constitutionally unconstrained authoritarian regimes with high industry dependence ratify IEAs much more quickly than unconstrained authoritarian regimes with low levels of industry dependence. This analysis also indicated that industry dependence had the opposite effect in highly constitutionally constrained regimes: more brown industry dependence led to more delayed ratification among these autocracies. Thus, high levels of domestic industry dependence uniquely compels *unconstrained* authoritarian regimes to increase their demands for IEA-membership; which is consistent with the comparative static results discussed in Chapter 2. These results hold for a variety of estimation techniques, sample-frames, and levels of temporal aggregation.

These findings contribute to the literature in three main ways. First, in demonstrating that *some* authoritarian regimes may use international institutions as a substitute for their lack of domestic institutional commitment mechanisms, this chapter furthers the development and testing of "genuinely interactive theories of domestic politics and international institutions," in accordance with calls for more research in this area by (17, 749). As such, the empirical results discussed above thereby also help to link two growing bodies of literature that separately examine (i) the interplay between domestic and international institutions (17, 30) and (ii) the comparative study of authoritarian regimes' foreign policy decisions (53, 162, 168, 169, 171).

Second, the establishment of a positive link between brown industry dependence and IEA-membership in unconstrained autocracies also challenges our tra-

ditional understandings of the pollution haven hypothesis. According to this hypothesis, declining trade barriers lead pollution-intensive industries to relocate to countries with less stringent environmental regulation (283). Consequently, nations with the lowest environmental regulation should attract relatively more (brown) industry-investment; becoming havens for polluting industries, while highly regulated countries will loose both industry and investment. The identified positive relationship between IEA-membership and brown industry dependence among unconstrained autocracies implies that *more* international environmental regulation can at times induce *more* domestic industry satisfaction—which is opposite to what the pollution haven theory would expect. Indeed, IEA membership levels correlate very highly with domestic environmental regulation, and the former is often used as a proxy for the latter (284, 285, 72). Thus, a key policy implication of this chapter is that—contra to the pollution haven hypothesis—(international) environmental regulation may at times help governments to stabilize and reassure their domestic brown industries, rather than compelling such industries to abscond.

In this vein, the above findings accordingly imply that brown industry dependence need not always serve as a barrier to increased environmental regulation. For many authoritarian regimes, such dependencies may actually *improve* environmental regulation through increased IEA-participation. This result accordingly underscores the importance of domestic (authoritarian) institutions in shaping countries' participation in international institutions. At the same time, however, an open question remains as to whether these dynamics in turn actually lead to verifiable changes in authoritarian country outcomes—at either the environmental quality or authoritarian regime survival levels—and I seek to address these concerns in the second empirical chapter and conclusion presented further below.

Thirdly, the theory and analysis presented here also contribute to our general understandings of state-industry relations within authoritarian regimes. Indeed, the established linkages between authoritarian institutions and international treaties help to explain the puzzling variation in authoritarian IEA ratification patterns reported in Chapter 1. In doing so, this chapter helps us to understand why the very authoritarian regimes that one would expect to be

least likely to pursue IEA membership (i.e. unconstrained, heavily industry-dependent autocracies) happen to be the most likely to quickly pursue such membership. Simply put, unconstrained autocracies still have access to a range of policy instruments—often at the international level—that can be pursued to make credible commitments to domestic actors. Given that many global environmental challenges—and the IEAs that address them—increasingly rest on timely participation by authoritarian countries, it is hoped that this insight will aid researchers and policymakers in effectively designing future IEAs that better elicit *global* participation.

4

The Implications of Environmental Treaty Ratification for Authoritarian Survival

4.1 Introduction

The preceding chapter established that *some* authoritarian regimes[1] have incentives to ratify IEAs quickly in order to credibly signal to domestic brown industry owners that their commitments to cost-offsetting compensation are credible. What implications do these behaviors have for authoritarian regime survival? In Chapter 2, I developed a formal theory that, in part, provided an answer to this question. Specifically, my one sided incomplete information signaling model revealed that constitutionally unconstrained authoritarian regimes with high levels of brown industry dependence will uniquely use IEA ratification, and IEA membership, to decrease brown industry owners' levels of opposition spending against the government and to accordingly prolong their (i.e. the autocrats') survival in office.

[1]Specifically, authoritarian regimes with low constitutional constraints and high brown industry dependence.

To arrive at these findings, the signaling model presenting in Chapter 2 began by assuming that, ex-post to IEA ratification, (i) autocrats expect to receive material benefits from IEA membership while (ii) brown industry owners instead anticipate a series of (IEA-regulation induced) costs. Faced with this potential for regulatory costs, brown industry owners accordingly put pressure on the autocrat to *not* ratify a given IEA by threatening to spend capital to depose an autocrat if an IEA is nevertheless ratified. Note that by parameterizing brown industry owners' threat of increased opposition as one in which capital is spent to remove an autocrat from power, my model subsumes multiple forms of actual authoritarian removal, including relatively peaceful authoritarian and democratic transitions, assassinations, and (bloodless) coup d'états. Indeed, evidence suggests that industry owners can influence each of these forms of removal by either spending or sacrificing capital so as to bolster opposition actors (or directly weaken autocrats) either politically or militarily.[1] These dynamics accordingly cast a trade-off for authoritarian leaders, whom must now weigh the (material) benefits of IEA membership against the potential costs associated with an IEA's ratification (via increased levels of industry opposition).

The signaling model in Chapter 2 evaluates the conditions under which an autocrat ultimately chooses to ratify an IEA, given the costs and benefits outlined above. In doing so, the model assumes that an autocrat can potentially ameliorate brown industry directed opposition efforts by credibly promising to industry owners future (IEA-cost offsetting) compensation. However, as the literature on authoritarian institutions widely recognizes,[2] authoritarian promises of these sorts often lack credibility due to autocratic leaders' deficiencies in domestic commitment mechanisms (e.g., credible elections)—a problem which is exacerbated by future uncertainty over IEA stringency and IEA enforcement. I therefore assume that it will be difficult for autocrats—and particularly weakly

[1] For example, industries have been shown to support coup d'états and coordinate major strikes in efforts to drain autocrats of resources (175, e.g.,), to more generally oppose autocratic governments via opposition spending and interest group lobbying (199, 200, 225, 244-252), and to encourage democratization through their financial (and direct) support of opposition and pro-democracy parties (201, 202, Ch. 5).

[2] See, e.g., (164, 187, 215, 216, 554).

constitutionally constrained autocrats—to credibly commit to providing compensation to brown industries, ex-ante, as industry owners will be uncertain of the credibility of these commitments. I then examine this incomplete information dilemma formally in Chapter 2, giving particular attention to (i) an autocratic leader's domestic constitutional constraints and (ii) the level of brown industry opposition (via a country's aggregate level of brown industry dependence) that an autocratic leader faces.

As summarized in Chapters 2 and 3, the signaling game initially revealed that brown industry dependence has divergent effects on autocracies' timings of IEA ratification, depending on an autocracy's level of domestic constitutional constraints. Specifically, unconstrained regimes with high levels of brown industry dependence are expected to ratify IEAs quickly, as this subset of authoritarian regimes has the unique incentives and abilities to use IEA ratification to signal *credible* commitments to compensation provision. On the other hand, constitutionally constrained authoritarian regimes, whom already possess domestic institutional commitment mechanisms, lack the ability to credibly commit to compensation-provision *via IEA-ratification*, giving these leaders—and industry owners—the incentives to delay IEA ratification as brown industry dependence (and hence domestic IEA opposition) increases. Hence, IEA-ratification uniquely ties the hands of constitutionally unconstrained authoritarian leaders with high industry dependence to provide brown industry owners with compensation ex-post to ratification.

Building upon these dynamics, the signaling model in Chapter 2 also indicates that, for those autocrats that are in fact able to tie their hands with IEA ratification (i.e. unconstrained autocracies with high brown industry dependence), immediate IEA ratification will effectively commit an autocrat to providing brown industry owners with this cost-offsetting compensation (ex-post). Based on this, the third and final proposition from the formal model in Chapter 2 suggests that this credible commitment, when effective, will in turn *reduce* the actual amount of capital spent by brown industry owners to depose of the autocrat in equilibrium. Hence, for constitutionally unconstrained authoritarian regimes with high levels of brown industry dependence, IEA ratification should serve as a means

of decreasing domestic opposition, and increasing an authoritarian leader's probability of survival in office. By contrast, among other authoritarian regimes,[1] authoritarian leaders are unable to use immediate IEA ratification as a hands-tying mechanism in the model, and hence their decision to immediately ratify an IEA (or not) should have no direct effect on subsequent levels of brown industry directed opposition spending (or on their resultant survival in office). Therefore, IEA-ratification should raise the probability of authoritarian-regime survival *only* among constitutionally unconstrained authoritarian regimes. This logic generates a third, and final, testable hypothesis:

Hypothesis 3: *IEA treaty ratification will increase an unconstrained autocrat's survival in office as industry dependence increases*

4.2 Analysis

To empirically test the above hypothesis, I focus on authoritarian governments' probabilities of survival in office as my primary dependent variable of interest. Consistent with Chapter 3, my sample covers the years 1972-2010, and treats the unit of analysis as the IEA-autocracy-month. However, in contrast to Chapter 3, an IEA-autocracy pair's time series in the current data set terminates when an autocratic regime fails, not when an IEA is ratified. Thus, the present sample frame allows me to examine the effects of an authoritarian governments' IEA membership—vis-á-vis each of the 15 individual global IEAs (described in Chapter 3 and Table 3.1)—on the probability of that authoritarian governments' survival (in months). Nevertheless, I examine a number of additional samples and research designs in the robustness section below to better ensure that my results are not sensitive to choices of sample frame and unit of analysis.

To code authoritarian governments' survival-spells and subsequent failures to the monthly level, I draw upon several core sources. Because my theory pertains to all forms of authoritarian regime failures—and not solely to instances where

[1]Such as authoritarian regimes with high levels of constitutional constraints or low levels of industry dependence.

an authoritarian regime transitioned to a democracy—I focus upon the coding scheme (and data set) developed by Geddes, Wright, and Frantz (179, 184), which records all instances of authoritarian regime failures, including those that are subsequently followed by another (distinct) authoritarian regime.[1] The authoritarian regime failures in the Geddes, Wright, and Frantz data set are at the yearly level, and hence my initial coding approach—which I implemented while working with a preliminary version of the Geddes, Wright, and Frantz data, was to match the recorded year of authoritarian regime failure in Geddes, Wright, and Frantz' data set with the most likely actual end event for that authoritarian government as based upon various academic accounts and news media reports. I then used these end events to determine the actual month of a regime's failure. However, the final release of the Geddes, Wright, and Frantz data set ultimately included an extensive list of the authors' actual identified end events, with specific dates, in an appendix to their code book (184). I therefore back-checked and then updated my monthly codings of authoritarian regime failures with the end event dates found in Geddes, Wright, and Frantz' code book.

I provide a detailed discussion of my coding decisions, sources, and the resultant monthly authoritarian government end-dates (and events) in the Data Appendix to this chapter (and Table 4.3). In brief, most of my recorded monthly end-dates matched those included in Geddes, Wright, and Frantz and I therefore default to these authors' code book as the primary source for these monthly end events. On the other hand, my monthly dates do not correspond to Geddes, Wright, and Frantz' data (i) in instances where I have added an authoritarian country that was omitted by the authors due to (small) population size,[2] (ii) in the cases where my codings of election end dates differ from Geddes, Wright, and Frantz' coding decisions, and (iii) in several cases where I have identified multiple possible end events within a single year. In these cases of non-correspondence, I provide additional sources for my event codings in the Data Appendix to this

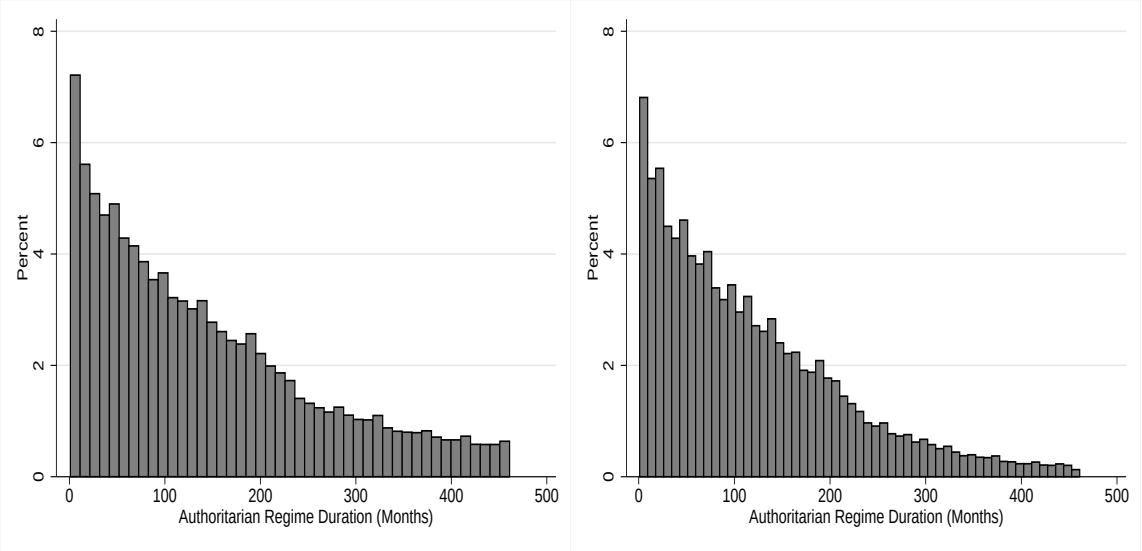
[1] An alternate approach would be to use the regime failures recorded in Cheibub, Gandhi, and Vreeland (7). These regime failures were not used here because they ignored many of the authoritarian-to-authoritarian government transitions recorded by Geddes, Wright, and Frantz (179, 184)—which as argued above are highly relevant cases for my theory.

[2] These additions encompassed 17 small population countries, which resulted in approximately 44 unique authoritarian regime spells.

chapter. I then also make use of the alternate end dates, listed in footnotes to Table 4.3, in the robustness analysis section presented further below. My justification for coding authoritarian regime end dates and survival spells to the monthly level of analysis, rather than yearly level of analysis, is provided in full in the Data Appendix. Suffice to say that this monthly approach allows me to better assess the effects of my IEA ratification and membership variables (which are measured at the monthly level) on my dependent variable of interest (i.e., monthly autocratic survival and failure), while also reducing measurement error in my operationalization of authoritarian regime failure itself. However, one tradeoff with this monthly aggregation strategy is that, similar to the analysis in Chapter 3 above, my monthly approach may artificially "inflate" my number of observations—a potential problem that I deal with below via robustness models that rely on random samples of all authoritarian regime spells.

Hence, my primary authoritarian regime failure measure, hereafter labeled *Authoritarian Failure*, is a binary variable coded as zero for regime-months in which a regime survived until the following month, and coded as one for regime-months in which a regime failed. For my sample, the mean for this variable is 166 months (approximately 13 years), with a standard deviation of 124 months (10 years), and a range of 1-461 months (0.08-38 years). A histogram reporting *Authoritarian Failure's* full autocracy-month distribution is presented in Figure 4.1a. For the analysis below, I then pair this measure with the 15 IEAs analyzed in Chapter 3 (see Table 3.1), where, as mentioned above, an autocracy-IEA-pair ends when an authoritarian regime is recorded as having failed. While I omit authoritarian-IEA-pairs which saw an authoritarian regime come to power *after* a specific IEA's ratification for this pairing, I found in preliminary analyses that this decision had no effect on the primary marginal effects presented below. The resultant mean of the paired, autocracy-IEA-month measure is 118 months (approximately 10 years) with a standard deviation of 98 months (8 years) and a range of 1-461 months (0.08-38 years). A histogram reporting *authoritarian failure's* full distribution at the autocracy-IEA-month level of analysis is reported in Figure 4.1b.

To fully test the hypothesis posited above, I must evaluate the effect of IEA membership on authoritarian survival—*conditional on an authoritarian regime's*



(a) Authoritarian Regime Observations **(b)** Authoritarian Regime-IEA Observations

Figure 4.1: Distributions of Authoritarian Regime Survival Spells (1972-2010)

levels of constitutional constraints and industry dependence. Before justifying and describing this three-way interaction, I first give attention to the core independent variable of interest for my test of Hypothesis 3: *IEA Membership*, as well as to my coding decisions thereof. Recall that my theory posited that IEA ratification (and membership) will enhance the survival of *some* authoritarian leaders (by committing these leaders to providing brown industry leaders with compensation), and that as a result, the signaling model presented in Chapter 2 indicated that these authoritarian leaders will accordingly seek to ratify IEAs more quickly. Hence, while an (constitutionally unconstrained, highly industry dependent) authoritarian leader's initial (timely) ratification of an IEA is the mechanism that signals leaders' commitments to compensation provision, it is the period of time subsequent to an IEA's ratification that matters most for assessments of authoritarian survival.

Indeed, these latter spells (i.e., the months ex-post to IEA ratification, hereafter referred to as IEA-membership months) are the periods of time for which, as based on the theory developed in Chapter 2, one should expect to see autocrats provide actual levels of compensation to brown industry owners (or not), and to

see brown industry owners ultimately decide upon whether or not to adjust their spending to depose of an autocratic leader. In fact, once an IEA is ratified, the signaling model discussed above suggests that an (unconstrained, highly industry dependent) autocrat's hands are tied to providing industry owners with compensation for the duration of an IEA, which implies that even in the months-to-years after an IEA's ratification, this subset of autocrats will continue to experience lower levels of industry-led opposition spending. The proper independent IEA variable for Hypothesis 3 should therefore allow one to evaluate authoritarian leaders' probabilities of survival in office for the entire duration of an authoritarian regime's membership within an IEA, ex-post to an IEA's ratification, rather than simply the actual month of ratification. Thus, the independent variable used here, termed *IEA Membership*, is a binary variable indicating of whether or not an authoritarian regime is a member to a given IEA in a given year-month, lagged by one month.[1]

As mentioned above, I must interact *IEA Membership* with the three primary independent variables used in Chapter 3—*Constitutional Constraints*, *Brown Industry*, and *ConstraintXIndustry*[2]—to fully test Hypothesis 3. I next briefly outline my justification(s) for employing this triple interaction approach. In evaluating Hypothesis 3, I am primarily interested in assessing whether *IEA Membership* has a negative effect on *Authoritarian Failure*[3] among constitutionally unconstrained authoritarian regimes with high levels of brown industry dependence. Because my concern is in the *effect* of *IEA Membership* vs. non-membership, I must directly include the dichotomous *IEA Membership* membership variable (described above) as an independent variable in my analysis—rather than censoring my sample to encompass *only* autocracy-IEA member months. The latter approach would limit my empirical comparisons to that of the effects of *ConstraintXIndustry* on authoritarian survival *among IEA member countries*, thereby treating authoritarian IEA members with high constitutional constraints and/or

[1]This variable, once coded one for a given autocracy-IEA pair, never transitions back to zero for my sample. This is consistent with broader IEA research, which has suggested that governments rarely, if ever, leave global IEAs once they become members (48, 253; Endnote 20).

[2]All three of these variables are lagged by one year. Their complete operationalizations are described in detail in Chapter 3.

[3] I.e. whether *IEA Membership* increases the prospects of authoritarian survival.

low industry dependence as the sole reference category. While this latter comparison is a salient one for my theory, it does not capture the entire reference category of interest for Hypothesis 3, as a key dimension of comparison for this Hypothesis relates to the comparison of *non-IEA member* unconstrained autocracies to *IEA member* unconstrained autocracies (at various levels of brown industry dependence).

At the same time, my theory of *IEA membership* is itself conditional upon an autocracy's levels of *Constitutional Constraints* and *Brown Industry*, as well as the interaction of these two variables (*ConstraintXIndustry*), given that it builds directly upon the behaviors outlined and confirmed in Hypotheses 1 and 2.[1] Thus, to fully capture and compare authoritarian regimes across the multiple dimensions described here, I must create a triple interaction of *Constitutional Constraints*, *Brown Industry*, and *IEA Membership*—yielding the multiplicative terms *ConstraintXIndustry*, *ConstraintXIEA*, *IndustryXIEA*, and *ConstraintXIndustryXIEA*—and include each term and its component parts as independent variables in the analysis below.

In addition to these core independent variables, the models presented here also build upon existing studies of authoritarian regime survival (e.g., 286, 287, 288, 289), to control for a number of potentially confounding variables.[2] I primarily do so in two steps: I first present a smaller specification with a limited number of controls, and I then present a larger specification with a more comprehensive set of control variables. Beginning first with the smaller specification, here I start by drawing upon extant analyses of authoritarian and democratic regime transitions by include one of the most fundamental control variables used in this line of research:[3] the log of an authoritarian country's GDP per capita (178). Second, I then include a 0-14 count variable (*Other IEA Memberships*) that measures, for each IEA-autocracy pair, the *total* number of *other* IEAs[4] that an autocratic country is already member to (lagged by one month). Indeed, while my dyadic, IEA-autocracy research design evaluates each individual IEA

[1] See Chapters 2 and 3.

[2] All independent variables included here are lagged by one year unless stated otherwise.

[3] See, for example (286, 287, 288, 290, 291, 292, 293) for applications of (and justifications for) using this control variable in studies of (authoritarian) regime survival/failure.

[4] Among the set of 15 IEAs that are examined in this analysis.

separately, IEA-membership decisions do not happen in a vacuum, and it is plausible that (past) aggregate levels of IEA membership may in some cases influence future IEA membership decisions,[1] in addition to having potential relationships with past (and thus current) levels of *Constitutional Constraints* and *Brown Industry Dependence*. Next, I control for an autocracy's dependence on natural resource rents as a share of GDP (*Resource Dependence*, 178), as past studies have widely argued (and in some cases demonstrated) that resource dependence can have a substantial effect on authoritarian survival and also (potentially) on the nature of authoritarian intuitions (165, 288, 290, 293, 324). Finally, I complete my smaller model specification of *Authoritarian Failure* with the inclusion of IEA specific, authoritarian regime-type specific,[2] and region-level specific fixed effects.[3]

The larger specifications examined below then include each of the control variables and sets of fixed effects listed above, as well as several additional salient controls for the study of authoritarian regime failure. In particular, I first add the other three ordinal components (*Constitutional Competitiveness*, *Parcomp*,[4] and *Parreg*[5]) to the ordinal Polity IV index (111), so as to account for these additional dimensions of a country's political-institutional profile.[6] Next, and in line with the justification for *Resource Dependence's* inclusion in the smaller model specification above, I include a measure of foreign direct investment (*FDI*) as a share of GDP in order to better control for an authoritarian leader's aggregate dependence on non-taxable sources of revenue, and the possible confounding effects that these revenue streams may have on (i) my independent variables of interest and (ii) *Authoritarian Failure*. Economic growth often lies at the heart of many theories of authoritarian regime failure and democratization,[7] and is likely also tied to

[1] By, for example, incentivizing subsequent IEA ratification decisions through socialization (55, 247, 294).

[2] Based upon the 10-fold authoritarian regime type classifications defined in (179, 255).

[3] I also use robust standard errors in the reported models below, though this decision does not affect the significance of my primary marginal effects.

[4] I.e., competitiveness of political participation.

[5] I.e., regulation of political participation.

[6] I do so for similar reasons to their inclusion in Chapter 3, i.e., to ensure that *Constitutional Constraints* is actually capturing the theoretical construct of interest, rather than serving as a proxy for democratic institutions or civil liberties more generally.

[7] See, e.g., (220, 292, 295).

brown industry dependence and authoritarian institutions (165, 257, 258, 296). This thereby leads me to control for *GDP Growth* in the larger specifications presented below. Because Cold War dynamics may have an effect on virtually all of my core independent and dependent variables,[1] I then add a dichotomous control for the *Cold War* era. Lastly, factors directly affecting (or threatening) the stability of authoritarian countries (and hence autocratic survival) may also affect related choices of authoritarian institutions (296) and industrialization (299, 300, 301). I therefore complete my larger model specifications with the inclusions of controls for *Conflict*[2] and *Natural Disasters*.[3]

While the control variables summarized above allow me to better ascertain the direct effects of my three independent variables (and their interactions) on *Authoritarian Failure* with regards to omitted variable bias, a number of challenges remain in accurately evaluating the direction of my interactive effects of *Constitutional Constraints*, *Brown Industry*, and *IEA Membership* within my models of authoritarian regime failure. Most notably—and as the theory outlined in Chapter 2 demonstrates—an autocracy's decision to become a member of an IEA (or not) is itself influenced by concerns over authoritarian survival, as well as by the values of my two other independent variables (and their interaction). This implies that *IEA Membership* is not randomly assigned, and that the factors leading an authoritarian regime to select into an IEA may also determine the likelihood of an authoritarian regime's eventual failure. This is a concern, as it suggests that *Authoritarian Failure* is simultaneously determined with *IEA Membership*, potentially rendering *IEA Membership* to be an endogenous regressor in the present chapter's analysis. To address these concerns, I choose to evaluate my tests of Hypothesis 3 within the framework of a bivariate probit model, which consists of two seemingly unrelated probit models with identically distributed bivariate normal

[1]For example, Levitsky and Way argue that the end of the Cold War brought about a dramatic change in the pressures affecting authoritarian survival (297), whereas others have noted that (post) cold-war dynamics have helped to shape the adoption of 'democratic' institutional constraints (165, 260, 331), authoritarian survival (298), and state-industrial relations (262, 263).

[2]Measured as an integer measure of a countries' yearly (inter and intra state) conflict intensity, with zero corresponding to little to no conflict, one corresponding to minor conflict (between 25 and 999 battle deaths) and two corresponding to War (i.e. at least 1000 battle deaths), taken from Gleditsch et al. (302).

[3]Measured as count of the natural disasters experienced by a country in a given year (303).

error terms (304, 305).[1] Under this framework, the models that I use to evaluate Hypothesis 3 now have two dependent variables: (i) my primary *Authoritarian Failure* outcome of interest and (ii) a dichotomous *IEA Membership* indicator,[2] and I accordingly account for temporal dependence in the former binary outcome (i.e., *Authoritarian Failure*) by including cubic polynomials approximations for time (till regime failure) dependence (i.e., t^1, t^2, and t^3) along the lines prescribed by Carter and Signorino (308).[3]

Similar to my *Authoritarian Failure* equation specifications, I create a small and large set of control variable specifications for the *IEA Membership* equation of my bivariate probit models, and I then match these small and large specifications to those outlined for the *Authoritarian Failure* equation above. Importantly in this regard, while my *IEA Membership* equation is largely employed as an econometric fix—so as to improve my ability to assess the direct effects of *IEA Membership* on *Authoritarian Failure* in my primary outcome equation—it also allows me to further evaluate the robustness of my empirical findings for Hypothesis 1 and 2 (albeit imperfectly), which posit that increases in brown industry dependence should increase the speed of IEA ratification (and thus the likelihood of IEA membership) under unconstrained autocracies but decrease the speed of IEA ratification among constitutionally constrained autocracies. Hence, for the small *IEA Membership* equation's specification, I include the "medium-sized" grouping of independent and control variables that were used to evaluate *IEA Ratification*

[1] An alternate approach would be to estimate these two processes simultaneously within a series of seemingly unrelated discrete-choice duration (SUDCD) models, such as those developed by Boehmke (306, 307). I experimented with these models but ultimately chose not to pursue them for the analysis at hand for two reasons. First, SUDCD models cannot currently account for time varying independent variables (in addition to a number of the fixed effects mentioned above and below), which are of substantial interest to me and to the theory at hand. Second, the SUDCD models that I did run, while achieving convergence, exhibited enough convergence difficulties to suggest to me that the relatively favorable results that I was obtaining were fragile at best, and likely not based on a global global optimum.

[2] Note that because I include post-ratification years in my autocracy-IEA paired sample, this second dependent variable must measure *IEA Membership*, rather than simply *IEA Ratification*.

[3] Note that I do not include t^1, t^2, and t^3 in the *IEA Membership* equation, as this binary dependent variable measures IEA membership (and hence remains equal to one for each month ex-post to IEA ratification), rather than measuring *IEA Ratification* (which would return to values of zero after ratification, in a manner more amenable to the inclusion of cubic polynomial approximations for time).

in Chapter 3 (i.e., Model 2 in Table 3.3),[1] along with the IEA-specific, authoritarian regime-type, and region-level fixed effects mentioned above.[2] The larger *IEA Membership* equation specification then adds to this set of covariates my control variable measuring an IEA's monthly *Regional Ratification* rate (lagged by one month).[3] The addition of further controls to this equation did not affect the robustness of my primary *IEA Membership* or *Authoritarian Failure* results, and hence these subsequent controls were omitted from the models reported below in the interest of parsimony.

The variable specifications, described above, for my bivariate probit equations thereby provide a plausible set of independent variables and controls for the evaluation of Hypotheses 3, and to a lesser extent, for auxiliary tests of Hypotheses 1 and 2. However, as with any multi-equation model, careful attention must be paid to issues of model parameter identification, and I now turn to a discussion of these issues for the bivariate probit models employed below. In notable contrast to *selection models*,[4] Heckman's bivariate probit model contended that for the bivariate probit model, parameter identification was achievable through full rank of the regressor matrix (304, 311, 3). Yet, as a number of scholars have pointed out (e.g., 311, 312) contemporary bivariate probit applications within political science and economics often imply that the inclusion of at least one exogenous independent variable within one (or both) equations of one's bivariate probit model is a necessary condition for parameter identification (e.g., 313, 314, 315, 909).

In part, this belief may be attributable to Maddala's (305) treatment of the bivariate probit model, which contended that an exclusion restriction within one's primary outcome equation of interest (i.e. the equation with the endogenous binary regressor) was necessary for proper model parameter identification (311, 3-4). Wilde however shows that Maddala's contention holds only for the limiting

[1]These variables are *Constitutional Constraints*, *Brown Industry*, *ConstraintXIndustry*, Constitutional Competitiveness, *Parcomp*, *Parreg*, *GDP per capita*, and *Trade Dependence*. See Chapter 3 for full discussion of their respective operationalizations.

[2]As demonstrated in the robustness section to this Chapter, my primary results hold when authoritarian regime-type fixed effects are withheld from either (or both) equations of the bivariate probit models discussed here.

[3]The operationalization of this variable is discussed in Chapter 3.

[4]Or to bivariate probit models with partial observability (309, 310).

case wherein a constant term is included as the *sole* exogenous regressor in each equation, and further demonstrates that "identification is achieved as soon as both equations of the model contains a varying exogenous regressor"(311, 316, 4). Thus, analyses of *IEA Membership* and *Authoritarian Failure* within a bivariate probit setup will meet parameter identification conditions even in cases where the (exogenous) independent variables in each equation overlap entirely. Nevertheless, recent research on this topic has argued that while formal (bivariate probit) identification is achieved with identical (varying) exogenous variables in each equation, this identification largely rests on strict assumptions over the (normally distributed) functional form of one's disturbances, which in turn suggests that exclusion restrictions may be necessary for the avoidance of distributional misspecification (311, 312). Hence, the bivariate probit models presented below maintain a number of plausible exclusion restrictions in each equation so as to accommodate these latter concerns.[1]

Finally, in assessing the statistical significance of my primary results in the bivariate probit models presented below, I present my (small and large) models when estimated with (i) my full sample of interest and (ii) a random sample of 20% of all authoritarian-IEA dyads. As argued above,[2] my autocracy-IEA-month level of analysis offers a number of benefits in terms of measurement and allowances for the inclusion of both IEA-specific and autocracy-specific covariates. However, this approach also increases my sample size substantially, and along several dimensions I am accordingly observing repeated *components* of each IEA-member-period across multiple observations. Moreover, because the standard errors estimated within the models presented below are a function of sampling uncertainty, the large number of observations that a monthly IEA-autocracy data set entails may lead me to underestimate the size of my standard errors (on all co-

[1]E.g., the *IEA Membership* stage for the (large) bivariate probit models reported below uniquely includes controls for that IEA's *Regional Ratification* rate and *Trade Dependence*—the latter a measure which is either deemed not sufficiently important enough for inclusion or insignificant in its estimated effects in models of (authoritarian) regime survival (e.g., 287, 288, 290, 291). The *Authoritarian Failure* equation then uniquely includes controls for *Conflict* and *Natural Disasters* (among others)—each of which have little-to-no theoretical or empirically established effect on authoritarian countries' rates of *IEA Membership*.

[2]As well as in Chapter 3 and the Data Appendix below.

variates), thereby increasing my likelihood of false positives.[1] While this problem is commonplace in empirical studies of international relations,[2] I nevertheless take this issue seriously here (and in the robustness section further below) by following the approach outlined in the robustness section of Chapter 3 to (i) randomly drop all but 20% of my authoritarian country dyads and then (ii) re-run all analyses on this comparatively smaller set of observations for the purposes of comparisons to my primary analyses.

4.2.1 Results

This section presents and interprets my primary bivariate probit results in a sequential manner. Specifically, I begin by examining my non-random sampled, small and large, bivariate probit models of *IEA Membership* and *Authoritarian Failure*, and then move on to discuss my random sampled results. Because the coefficient estimates and standard errors for my triple interaction term's various component parts are difficult to interpret in table form for these models, I present the main tables of results for each model in the Analysis Appendix (Table 4.1-4.2), and focus on presenting and discussing the plotted marginal effects in the section at hand. Nevertheless, before proceeding to discuss my primary interaction-results, the coefficient estimates for several key control variables achieve statistical significance within my small and large bivariate probit models (Table 4.1), and I therefore briefly discuss these findings here.

Beginning first with the *IEA Membership* equation of my (small and large) non-random sampled bivariate probit models, one can first note that *GDP pc* is positive and statistically significant, suggesting that developed autocracies are more likely to be IEA members; whereas *Trade Dependence* is negative and statistically significant, suggesting that controlling for development, highly trade dependent countries are less likely to be IEA members.[3] Among the other com-

[1] Provided that the sign of a given coefficient is in the expected direction to begin with, which arguably is a relatively high bar for theories pertaining to (triple) interactions.

[2] See, for example, dyadic and directed-dyadic studies of war and militarized interstate disputes (e.g., 310, 317, 318, 319).

[3] These controls are both insignificant in Chapter 3. By comparison, Neumayer (70, 104) similarly reports that national income increases the likelihood of IEA membership, as well as the speed in which a country ratifies an IEA, though he also finds trade to be an insignificant

ponent parts to Polity IV, *Executive Competitiveness* is negative and significant, competitiveness of political participation is negative and significant, and regulation of political participation is positive (but only significant in the smaller specification). Together these results may suggest that some dimensions of "democracy" (e.g., competitive elections) lead an authoritarian to be less likely to be an IEA member, whereas other dimensions may increase an autocracy's probability of *IEA Membership*. Finally, *Regional Ratification* is positive and significant in my large model specification, implying that there is a strong regional influence on an autocracy's likelihood of IEA ratification, which is consistent with extant research on policy diffusion, social pressures, and (environmental) treaty ratification (e.g., 47, 48, 320), as well as with the findings reported in Chapter 3.

Turning next to the control variables included within the *Authoritarian Failure* equation of my (small and large) bivariate probit models, *GDP pc*, *Resource Dependence* and *GDP growth* are each negative and significant, suggesting that higher levels of development, more natural resource wealth, and better economic performance can each reduce the likelihood of an authoritarian regime's failure.[1] Looking again at my Polity IV component controls, *Executive Competitiveness* is negative and significant (thus decreasing the likelihood of authoritarian failure), competitiveness of political participation is similarly negative (and significant in the smaller specification), and regulation of political participation is positive and significant. The former two findings may suggest that co-optation serves to increase authoritarian leaders' tenures, whereas in part, the latter finding may support the argument and findings advanced by Gates et al. (321), which suggests that the institutional inconsistencies that arise within autocracies exhibiting strong democratic institutions will increase the likelihood of autocratic regime failure. *Cold War* is positive and significant, implying that authoritarian regimes have a higher likelihood of failure during the Cold War era, which, to a degree, is consistent with the findings reported in similar studies (e.g., 298), but contradicted by others (287). Finally, *FDI*, *Conflict*, and *Natural Disasters* are each insignificant in the *Authoritarian Failure* equation equation of the large non-random sample Bivariate Probit models.

(or occasionally positive) predictor of IEA membership (70, 828-830).

[1]These findings are consistent with extant research, e.g., (287, 288, 290).

The results reported in Table 4.1 also support my choice of the bivariate probit model over a comparable estimation approach that employs two separate probit models to evaluate *Authoritarian Failure* and *IEA Membership*. Indeed, the correlation parameter (ρ) for both the small and large bivariate probit models reported in Table 4.1 is positive and statistically significant (at the $p<0.01$ and $p<0.05$ levels, respectively). According to Madalla and others (311, 312, 322), this implies that one can reject a null hypothesis of $\rho = 0$ under a "t-test" based on $\frac{\hat{\rho}}{se(\hat{\rho})}$, thereby offering some evidence in support of my allowance for correlated disturbances between estimations of *IEA Membership* and *Authoritarian Failure*, and the usage of the bivariate probit model in this context more generally. In addition, I also employ likelihood ratio tests as a second means of comparing my usage of a bivariate probit framework to that of (the sum of) two univariate probit equations. According to this approach, the log likelihood of my bivariate probit model (ll_{bvp}) will be equal (or inferior) to the sum of the log likelihoods from two equivalent individual probit models ($ll_p = ll_{p1} + ll_{p2}$) when $\rho = 0$, allowing me to compare the two resultant log likelihoods within the usual likelihood ratio test framework, i.e., $LR = -2(ll_{bvp} - ll_p) \rightarrow \chi_1$ (311). The associated $LR \rightarrow \chi_1$ test statistic's p-values, for both the small and large model specifications presented in Table 4.1, are lower than 0.001, suggesting that my accommodation of correlated disturbances yields a significant improvement in model fit—thereby favoring my use of the bivariate probit model over a comparable set of individual probit estimators.

I next turn to discuss my primary (non-random sampled) results, first for the small model specification discussed above, and then for the larger specification. To directly assess my core interactive results, I follow Brambor, Clark, and Golder (323) and use parametric bootstraps ($m = 10000$) to simulate conditional marginal effects for several of my interacted variables of interest, and plot these results along with the 95% confidence intervals within a series of graphs below.[1] Turning to my smaller model specification, I first examine the marginal effects of several key dimensions to my *Constitutional Constraints*, *Brown Industry*, and *IEA Membership* triple interaction's coefficient estimates, which serves as my primary test of Hypothesis 3. To do so, I primarily examine the marginal

[1] All other variables are held to their means are modes for these simulations.

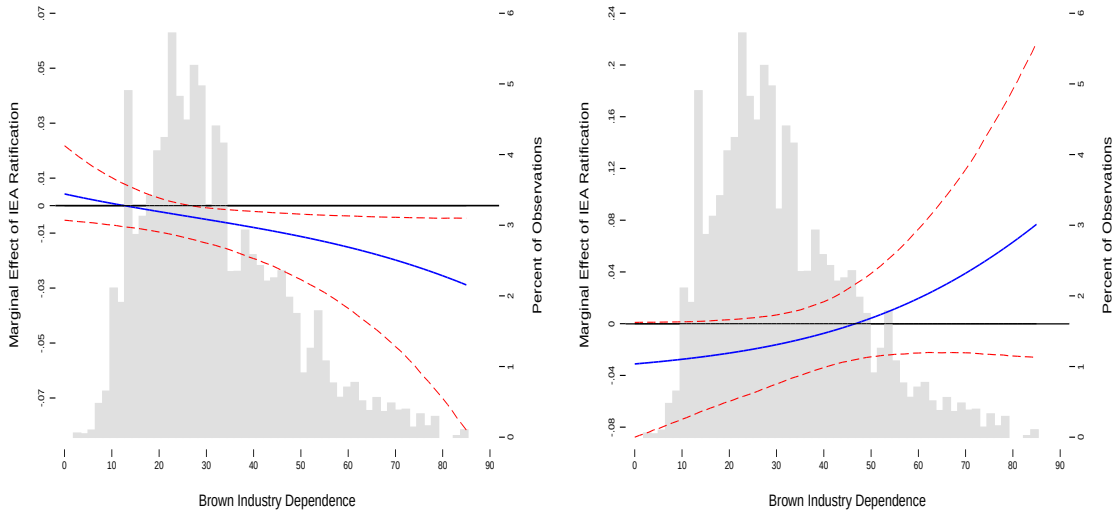
effect of a $0 \rightarrow 1$ change in *IEA Membership*—separately for constitutionally constrained and constitutionally unconstrained autocrats—as one increases *Brown Industry* dependence from its minimum (1.88%) to its maximum value (85.34%) for the sample at hand. Beginning first with the results for constitutionally unconstrained authoritarian regimes, I find in Figure 4.2a that, in support of Hypothesis 3, a $0 \rightarrow 1$ change in *IEA Membership* has a slightly positive, but insignificant effect on the likelihood of *Authoritarian Failure* at very low levels of *Brown Industry* dependence, but then has an increasingly negative and significant effect on *Authoritarian Failure* (thereby prolonging authoritarian survival) as *Brown Industry* dependence increases. Conversely, Figure 4.2b reveals that a $0 \rightarrow 1$ change in *IEA Membership* among constitutionally constrained authoritarian regimes *does not* lead to comparable increases in authoritarian survival as *Brown Industry* dependence increases[1]—thereby implying that the regime-prolonging effects of *IEA Membership* are indeed unique to constitutionally unconstrained authoritarian regimes (with medium to high levels of *Brown Industry* dependence).

The interaction term results for the small bivariate probit model's *IEA Membership* equation similarly support Hypotheses 1 and 2. Recall that these two Hypotheses respectively posited that (i) *Industry Dependence* should increase the speed of IEA-ratification under unconstrained autocracies whereas (ii) *Industry Dependence* should decrease the speed of IEA-ratification under constrained autocracies. While I do not examine IEA ratification speed within my *IEA Membership* equation, per se, longer observed spells of *IEA Membership*—relative to non membership months—nevertheless imply stronger demand for IEAs, and hence allow for an auxiliary, albeit imperfect, test of Hypotheses 1 and 2. Figure 4.3a therefore plots the marginal effect of a *decrease* in *Constitutional Constraints*[2] on *IEA Membership* across the entire range of *Brown Industry*, whereas Figure 4.3b plots the marginal effects of a $15\% \rightarrow 50\%$ increase in *Brown Industry* dependence across the entire range of *Constitutional Constraints*.[3] I discuss each

[1] In fact, the marginal effect in this case suggests that the probability of authoritarian failure increases under *IEA Membership*, as *Brown Industry* dependence increases—though this effect is insignificant across the entire range of *Brown Industry*.

[2] From six (i.e., a wholly constrained authoritarian regime) to zero (i.e., a wholly unconstrained authoritarian regime).

[3] My reporting of both marginal effects in this case is consistent with the approach suggested and outlined in Berry, Golder, and Milton (324).

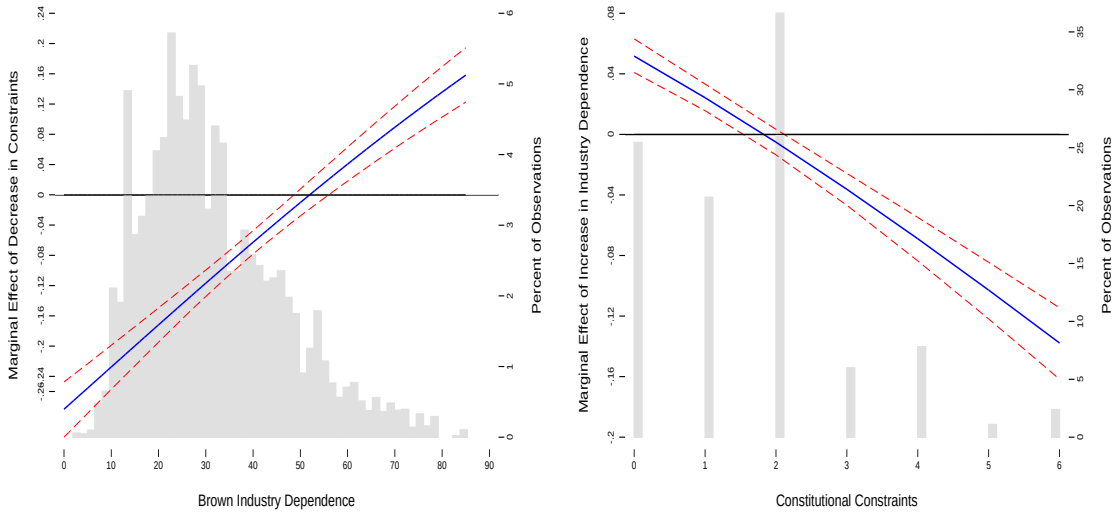


(a) Unconstrained Authoritarian Regimes **(b)** Constrained Authoritarian Regimes

Figure 4.2: Marginal Effect of IEA Ratification on Pr(Authoritarian Regime Failure)

figure in turn. First, as one can see in Figure 4.3a, a decrease in *Constitutional Constraints* is associated with a lower likelihood of *IEA Membership* at low-to-moderate levels of *Brown Industry* dependence, whereas—and in support of Hypothesis 1—it is instead associated with an increased likelihood of *IEA Membership* at higher levels of *Brown Industry* dependence. Second, and more directly in support of both Hypotheses 1 and 2, Figure 4.3b similarly indicates that an increase in *Brown Industry* dependence is associated with an increased likelihood of *IEA Membership* among autocracies with low levels of *Constitutional Constraints*, but a decreased likelihood of *IEA Membership* among autocracies with medium-to-high levels of *Constitutional Constraints*.

The larger bivariate probit specification (non-random sampled) results reinforce the above conclusions, and suggest that my primary results are not overly sensitive to omitted variable bias. As before, I report the main table with these results in the Analysis Appendix to this chapter (Table 4.1) and focus on the plotted marginal effects when interpreting my (*IEA Membership* and *Authoritarian Failure*) equations' respective interaction terms and their associated component parts. Looking first again at the *Constitutional Constraints*, *Brown Industry*, and

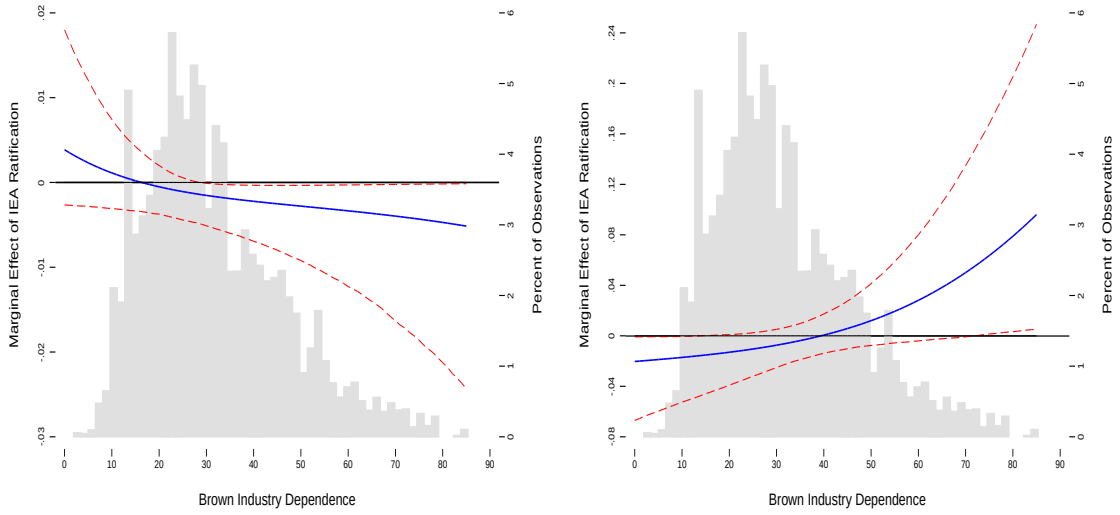


(a) Effect of 6-to-0 Change in Constitutional Constraints

(b) Effect of 15%-to-50% Change in Industry Dependence

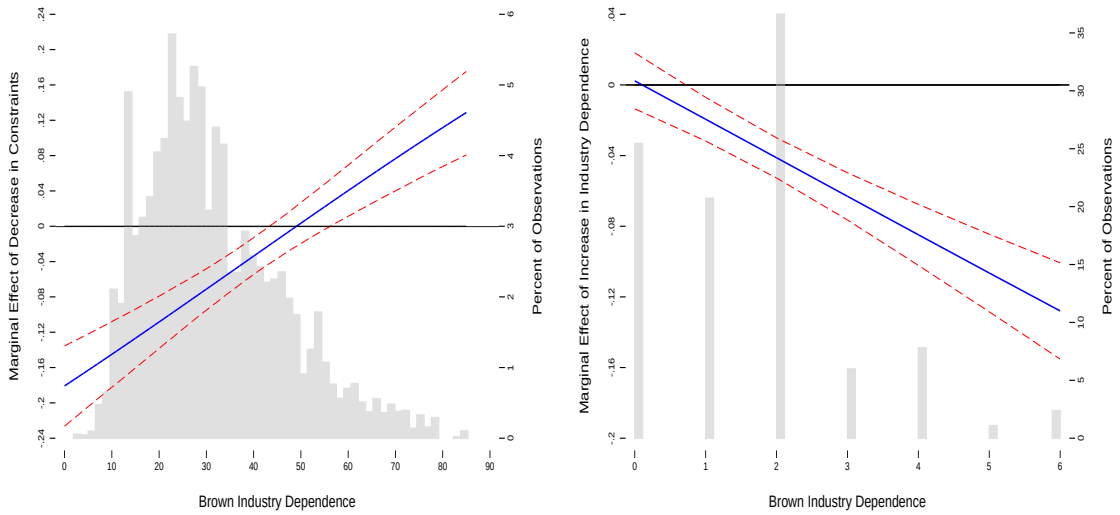
Figure 4.3: Predicted Probability of IEA Membership

IEA Membership triple interaction terms' effects, which appear in Figure 4.4, one can note that the inclusion of additional control variables (summarized above) does not affect the main results. Specifically, a $0 \rightarrow 1$ change in *IEA Membership* continues to have a significant, and increasingly negative effect on *Authoritarian Failure* as *Brown Industry* dependence increases among unconstrained autocrats (Figure 4.4a), while a comparable increase in *IEA Membership* has a generally insignificant and marginally increasingly positive effect on *Authoritarian Failure* among constrained autocrats (Figure 4.4b). Hence, IEAs are again estimated to uniquely extend the survival of constitutionally unconstrained authoritarian regimes (with moderate to high levels of industry dependence), which is in support of Hypothesis 3. Turning to the large *IEA Membership* equation's marginal effects in Figure 4.5, my results are again consistent with Hypotheses 1 and 2, in suggesting that (i) decreases in *Constitutional Constraints* are associated with significant increases in *IEA Membership* only at high levels of *Brown Industry* and (ii) a $15\% \rightarrow 50\%$ increase in *Brown Industry* dependence is increasingly associated with lower likelihoods of *IEA Membership* as *Constitutional Constraints* increase.



(a) Unconstrained Authoritarian Regimes **(b)** Constrained Authoritarian Regimes

Figure 4.4: Marginal Effect of IEA Ratification on Pr(Authoritarian Regime Failure) - Large Model



(a) Effect of 6-to-0 Change in Constitutional Constraints **(b)** Effect of 15%-to-50% Change in Industry Dependence

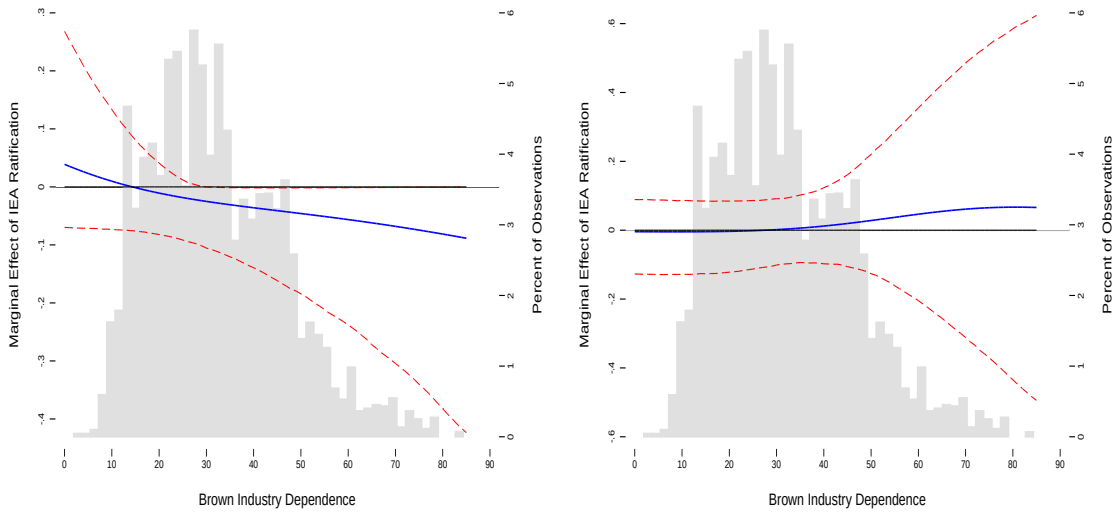
Figure 4.5: Predicted Probability of IEA Membership - Large Model

Given that my primary findings generally support Hypothesis 3—in addition to providing a degree of indirect support for Hypotheses 1 and 2—I next seek to examine the extent to which these findings are dependent upon my sampling of *all* autocracy-IEA pairs with available data (and the large number of observations that this sample entails). To do so, I follow the approach discussed in the Robustness Section of Chapter 3 (and outlined above) and take a random sample of 20% of all available autocracy-IEA dyads, 1972-2010. I then re-run the primary bivariate probit analyses presented earlier—for both my small and large model specifications—using this random sub-sample. As above, I focus here on presenting and interpreting the plotted marginal effects from my *IEA Membership* and *Authoritarian Failure* equations, though I also report a table of these sub-sample results in the Data Appendix further below (Table 4.2).

Looking first at the small specification's sub-sample results, which appear in Figures 4.6-4.7, one can note that these results are highly consistent in both direction and significance with those discussed above, although the slope and variance of this subsample's marginal effects deviate—to a degree—from the results presented in Figures 4.2-4.3. Specifically—and beginning first with the *Authoritarian Failure* equation results reported in Figure 4.6—we can note that *IEA Membership* continues to have a negative effect on *Authoritarian Failure* as *Brown Industry* dependence increases only among constitutionally unconstrained autocracies—though this effect now is now only barely significant at the $p<0.05$ level for unconstrained authoritarian regimes (Figure 4.6a).[1] Turning next to the *IEA Membership* equation sub-sample results (Figure 4.7), one can note in this case that the marginal effects of *Brown Industry* and *Constitutional Constraints* on *IEA Membership* are very similar to those reported in Figure 4.3—providing an added degree of support for Hypotheses 1 and 2.

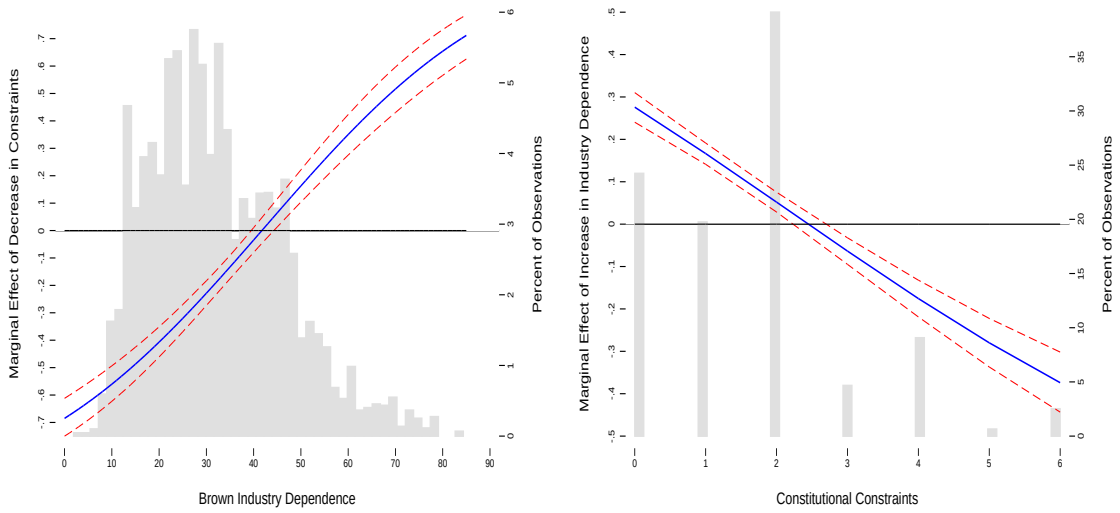
I next replicate my large bivariate probit model specifications using the same random sub-sample employed for the small sub-sample analysis discussed immediately above. The marginal effects plots from these larger models appear below.

[1]The comparable marginal effect for constrained autocracies not only exhibits a similar increase in uncertainty, but also suggests a change in slope, as Figure 4.6b indicates that a $0 \rightarrow 1$ change in *IEA Membership* is now estimated to generally have no (*Brown Industry*-contingent) effect on an autocracy's probability of failure.



(a) Unconstrained Authoritarian Regimes **(b)** Constrained Authoritarian Regimes

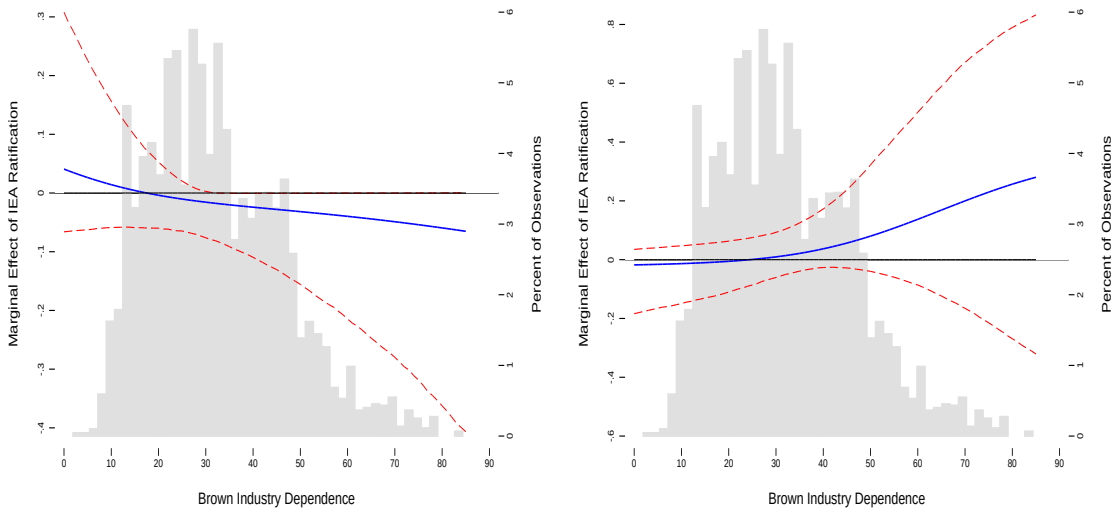
Figure 4.6: Marginal Effect of IEA Ratification on Pr(Authoritarian Regime Failure) - Small Model, Random Sample



(a) Effect of 6-to-0 Change in Constitutional Constraints **(b)** Effect of 15%-to-50% Change in Industry Dependence

Figure 4.7: Predicted Probability of IEA Membership - Small Model, Random Sample

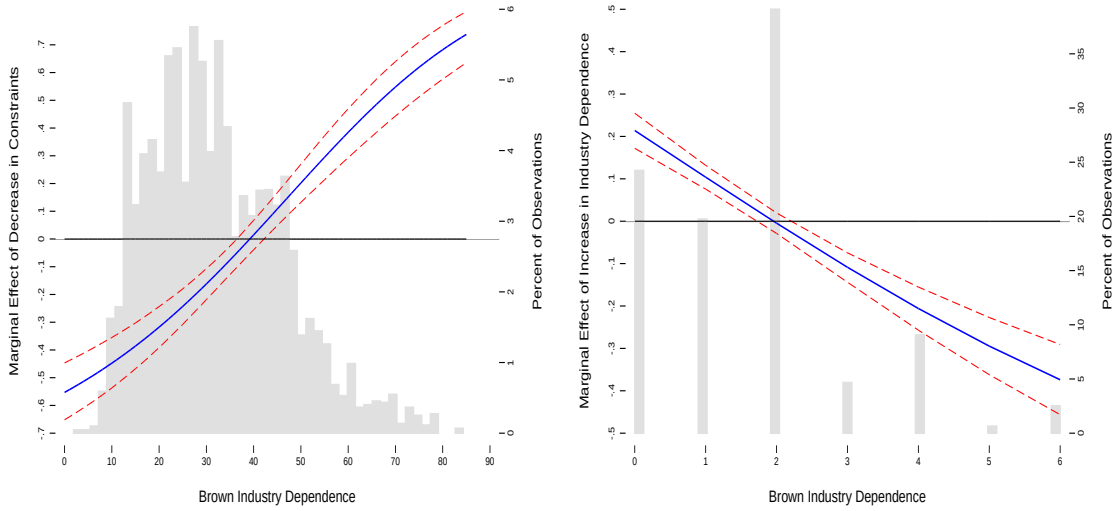
In support of Hypothesis 3, I again find (in Figure 4.8a) that among constitutionally unconstrained authoritarian regimes, a $0 \rightarrow 1$ change in *IEA Membership* has an increasingly negative and (marginally) significant effect on *Authoritarian Failure* as *Brown Industry* dependence increases—though as above, these sub-sample marginal effects results exhibit a higher degree of uncertainty, relative to the full sample results.[1] In support of Hypotheses 1 and 2, the large sub-sample results similarly suggest that increases in *Industry Dependence* have divergent effects on the likelihood of *IEA Membership* depending on an autocracy's level of *Constitutional Constraints*. For instance, as indicated by Figure 4.9b, a 15% $\rightarrow$ 50% increase in *Brown Industry* dependence is roughly associated with a 5% increase in the probability of *IEA Membership* among wholly unconstrained autocracies, but is instead associated with a 15% decrease in the probability of *IEA Membership* among wholly constrained autocracies.



(a) Unconstrained Authoritarian Regimes **(b)** Constrained Authoritarian Regimes

Figure 4.8: Marginal Effect of IEA Ratification on Pr(Authoritarian Regime Failure) - Large Model, Random Sample

[1]However, and in contrast to the constrained authoritarian regime results for the small sub-sample specification (i.e., Figure 4.6b), the unconstrained authoritarian regime results for the large sub-sample specification (Figure 4.8b) suggest that there is an increasingly positive (albeit insignificant) effect of *IEA Membership* on *Authoritarian Failure* as one increases *Brown Industry* dependence across its range.



(a) Effect of 6-to-0 Change in Constitutional Constraints

(b) Effect of 15%-to-50% Change in Industry Dependence

Figure 4.9: Predicted Probability of IEA Membership - Large Model, Random Sample

In sum, the results presented here suggest that (i) IEA membership *uniquely* increases autocrats' probabilities of survival in office for authoritarian regimes with low constitutional constraints and high industry dependence (Hypothesis 3) and (ii) industry dependence increases the likelihood of IEA membership for constitutionally unconstrained authoritarian regimes but decreases this likelihood among more constitutionally constrained regimes (Hypotheses 1 and 2). These findings do not appear to be highly dependent upon control variable specification or case selection. However, my assessment of these latter dependencies has been fairly limited thus far, and I therefore examine the sensitivity of the above results in more detail in the robustness section immediately below.

4.2.2 Robustness Models

In assessing the overall robustness of the above results, this section again primarily focuses on evaluating the significance levels of my robustness models' plotted marginal effects, which I extract in a comparable fashion to the parametric boot-

strapped marginal effects approach used above.[1] As in Chapter 3, I first seek to determine whether my significant results are contingent upon the inclusion of any particularly exceptional case(s). DFbeta scores were calculated using the small model specification presented above, and observations returning extreme DFbeta values were then excluded from a subsequent re-analysis. Doing so did not affect the primary findings discussed above. I next estimate 16 additional models,[2] dropping each of my 15 IEAs one at a time, and then dropping the two framework conventions[3] simultaneously. I do not report the marginal effects graphs or tables for these 16 robustness models here in the interest of space. However, across all 16 of these additional specifications, the marginal effects of *IEA Membership* on *Authoritarian Failure* among unconstrained authoritarian regimes were insignificant at low levels of *Brown Industry* dependence, and increasingly negative and significant at higher levels of *Brown Industry* dependence, which is consistent with the findings discussed above, as well as with Hypothesis 3. Similarly, the extracted marginal effects figures for the effects of *Brown Industry*, *Constitutional Constraints*, and *ConstraintXIndustry* on *IEA Membership* (across all 16 robustness models) were comparable to those reported above, and thereby provide a degree of additional support for Hypotheses 1 and 2.

The first set of robustness models that I examine in detail below re-estimate the small bivariate probit specifications presented above[4] *without* the inclusion of authoritarian regime type fixed effects in either stage. This robustness model is important because, as mentioned above (and in the Data Appendix below), my monthly codings of authoritarian regime spells led me to include 17 additional small population authoritarian countries (resulting in approximately 44 unique authoritarian regime spells) that were not recorded by Geddes, Wright, and Frantz (184). Hence, these cases were dropped from the above analyses due to list-wise deletion, as the above models included Geddes, Wright, and Frantz'

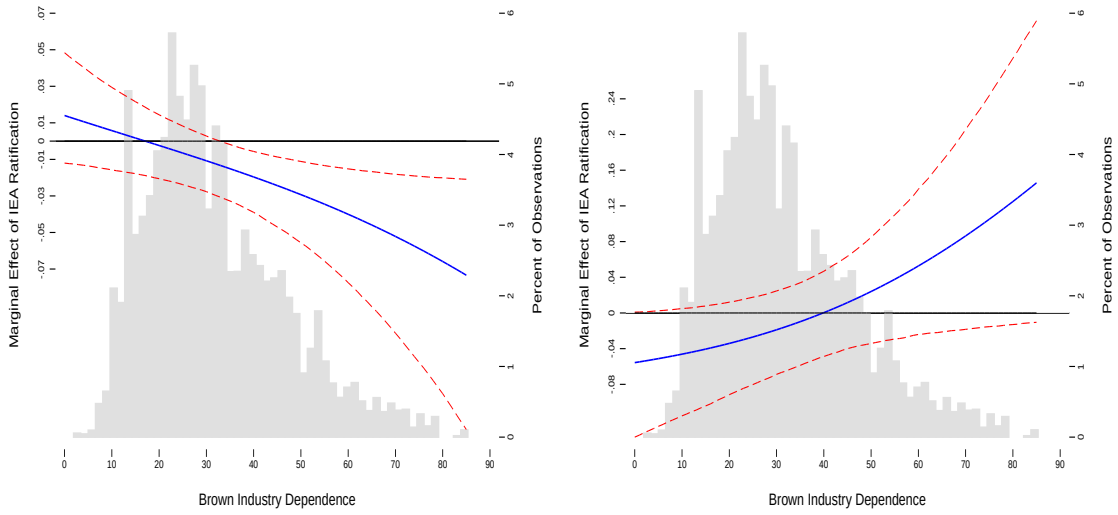
[1] That is, I do not report or interpret the coefficient size or tables for these robustness models, as they provide little insight into whether these models' primary results are consistent with those discussed above.

[2] Using the full (i.e. non-random sample) of autocracy-IEA months and the small model specifications presented above.

[3] The Vienna Convention and the UNFCCC.

[4] Specifically the non-random sample results.

authoritarian regime type variables as fixed effects. I accordingly examine comparable models that do not drop these additional cases (as a result of the inclusion of authoritarian regime type controls) here.[1] Rather than presenting an additional Table of these results, I simply present the plotted estimated marginal effects that were derived from these robustness models, as calculated using the same procedures described in the main results section above, for both the *IEA Membership* and *Authoritarian Failure* equations. In support of Hypotheses 1-3, the marginal effects presented in Figures 4.10 and 4.11 reinforce the core findings of this Chapter, and in some cases provide even stronger support for Hypothesis 3 (e.g., 4.10a) than do the primary models discussed above. Therefore, my primary findings do not appear to be dependent on the exclusion of any small population autocracies arising from my controlling for authoritarian regime type fixed effects (and the missingness this entails).[2]

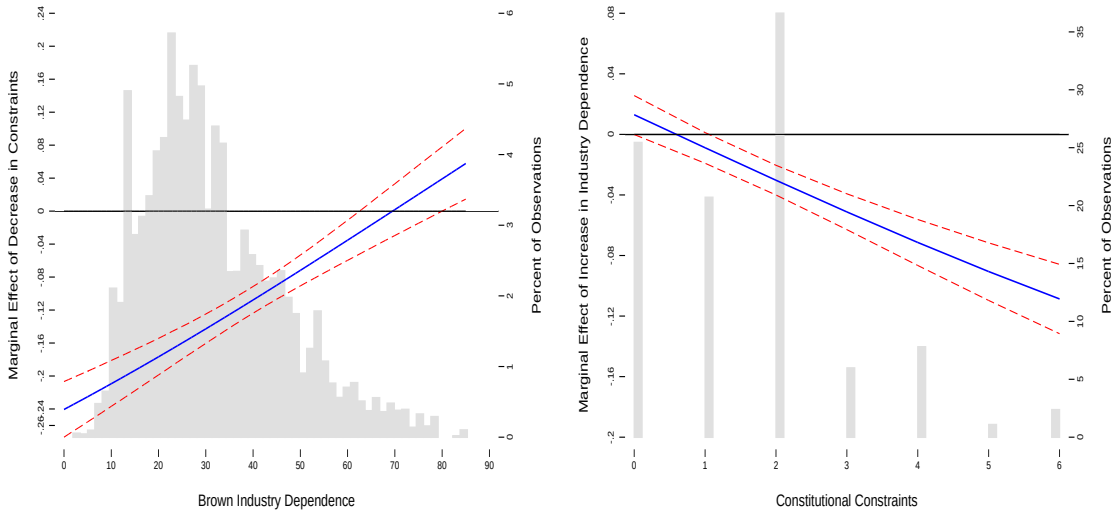


(a) Unconstrained Authoritarian Regimes **(b)** Constrained Authoritarian Regimes

Figure 4.10: Marginal Effect of IEA Ratification on Pr(Authoritarian Regime Failure)—Small Specification, No Authoritarian Regime Fixed-Effects

[1]Though note that many of these regime spells are still missing from this robustness analysis through the inclusion of my other independent variables and controls.

[2]Moreover, though not reported here, the insights from Figures 4.10-4.11 also hold when a comparable set of robustness models are estimated while including authoritarian regime type fixed effects in *only* the *IEA Membership* or *Authoritarian Failure* equations.



(a) Effect of 6-to-0 Change in Constitutional Constraints

(b) Effect of 15%-to-50% Change in Industry Dependence

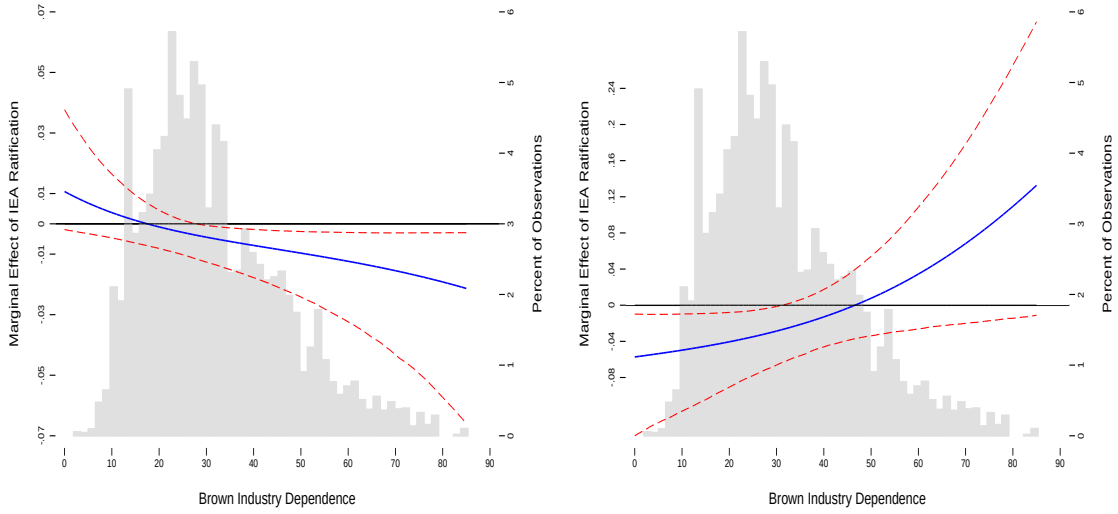
Figure 4.11: Predicted Probability of IEA Membership—Small Specification, No Authoritarian Regime Fixed-Effects

The next set of robustness models that I examine in detail recreate my primary (non-random sampled) analyses above whilst employing the 38 *alternate* authoritarian regime spell end-dates that are listed in the footnotes to Table 4.3 in my Data Appendix.[1] Re-estimating my primary (small and large) bivariate probit specifications in this manner provides additional evidence for the robustness of this Chapter's core results to, e.g., authoritarian end-date coding decisions.[2] The marginal effects extracted from the resultant (large and small) bivariate probit specifications for this set of robustness models were highly similar to one another, and hence I focus on reporting and discussing the small bivariate probit model marginal effects here. These marginal effects are plotted in Figures 4.12 and 4.13 below. Beginning first with Figure 4.12, we can again note that the marginal effect of *IEA Membership* on *Authoritarian Failure* is increasingly negative and

[1]These alternate end dates are describe in more detail in the discussion section to the Data Appendix further below.

[2]Such as the differences in how I and Geddes, Wright, and Frantz each code democratic elections as an authoritarian regime end event (see the Data Appendix for more details on these differences).

significant for unconstrained authoritarian regimes as *Brown Industry* dependence increases (Figure 4.12a), thereby again confirming Hypothesis 3.[1] Similarly, Figure 4.13 demonstrates that—in support of Hypotheses 1 and 2—high levels of industry dependence have divergent effects on an authoritarian regime's likelihood of *IEA Membership*; increasing the likelihood of membership among unconstrained authoritarian regimes and decreasing the likelihood of membership for constitutionally constrained authoritarian regimes (Figure 4.13b).[2]



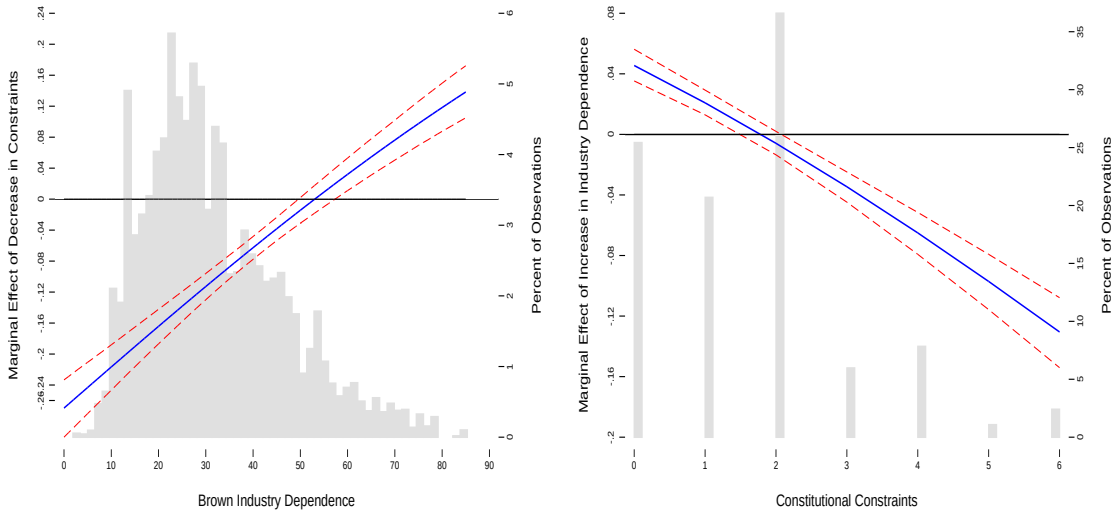
(a) Unconstrained Authoritarian Regimes **(b)** Constrained Authoritarian Regimes

Figure 4.12: Marginal Effect of IEA Ratification on Pr(Authoritarian Regime Failure) (Alternate Authoritarian End Dates)

At the same time, I have also identified a number of robustness models that *do not* provide (strong) support for the results discussed above, which in turn may suggest that my Chapter 4 findings are less robust than those discussed in Chapter 3. Individual probit models—examining *Authoritarian Failure* exclusively—did

[1]Conversely, Figure 4.12b indicates that for highly constitutionally constrained authoritarian regimes, *IEA Membership* has an increasingly positive effect on the probability of *Authoritarian Failure* as *Brown Industry* dependence increases, though this effect is only significant at low levels of *Brown Industry* dependence.

[2]The same could be said for Figure 4.13a, in that decreases in constitutional constraints lowers the probability of *IEA Membership* in authoritarian regimes with medium to low levels of *Brown Industry Dependence* and increases the probability of *IEA Membership* within authoritarian regimes with high levels of *Brown Industry* dependence.



(a) Effect of 6-to-0 Change in Constitutional Constraints

(b) Effect of 15%-to-50% Change in Industry Dependence

Figure 4.13: Predicted Probability of IEA Membership (Alternate Authoritarian End Dates)

not yield statistically significant marginal effects estimates,[1] though as discussed in the results section above, "t-tests" and likelihood ratio tests indicated that this univariate probit approach was inferior to the bivariate probit models presented above. I also attempted to re-estimate my primary (small and large) bivariate probit models of *Authoritarian Failure* and *IEA Membership* with the addition of year-level fixed effects[2] in both (or either) bivariate probit equations. Similar to my attempts to estimate my outcomes with SUDCD models (mentioned in a footnote to the Analysis section further above), these robustness models exhibited a variety of convergence problems and ultimately did not yield realistic estimates.

The random sample results discussed above, while generally in support of Hypotheses 1-3, also exhibit sufficient variance and deviance from my primary results to suggest that my random sampling routine might be unstable and nonrepresentative of sub-samples more generally. Accordingly, I drew a second random

[1]However, the directions of these marginal effects are consistent with the primary findings discussed above.

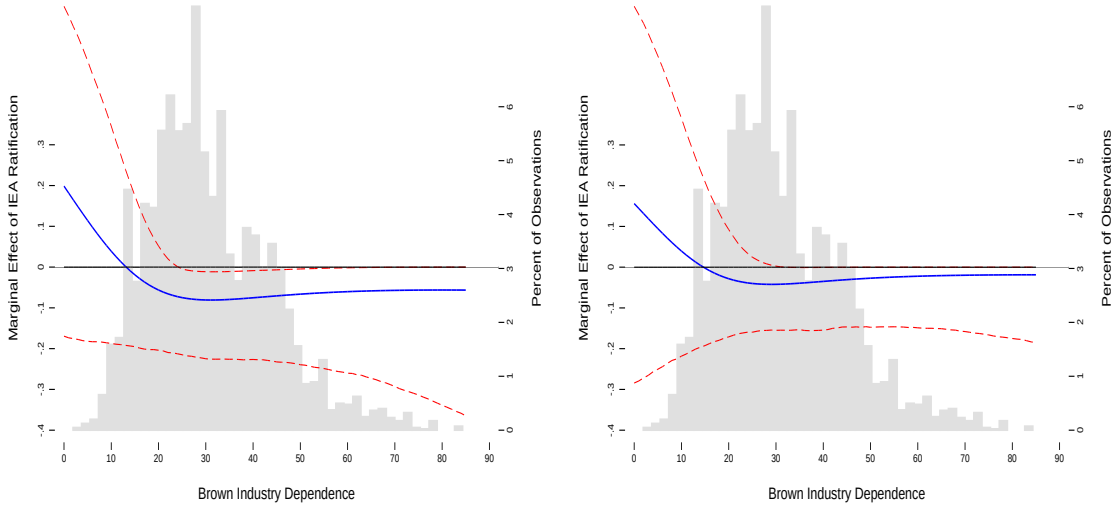
[2]This entailed dropping a small set of controls from the my bivariate probit models, e.g., *Cold War*.

sample of autocracy-IEAs—in this case by simply increasing the random number seed by one—and re-evaluated my bivariate probit results. The *IEA Membership* equation results were virtually identical to those presented above,[1] for both the small and large specifications, and I therefore do not reproduce these marginal effects plots here. On the other hand, the marginal effect of *IEA Member* on *Authoritarian Failure* among unconstrained authoritarian regimes (at various levels of *Brown Industry* dependence), while still (barely) statistically significant in their expected directions, exhibit a far more distorted relationship than the primary (and random sample) marginal effects results discussed above. Presenting these unconstrained authoritarian regime marginal effects results for both the small and large specifications in Figure 4.14 below, I specifically find that becoming a member to an IEA has little (increased) positive effect on authoritarian survival once an autocrat has achieved even low to moderate levels of *Brown Industry* dependence. While these secondary random-sample results may have arisen from a highly distorted draw of authoritarian regimes, their implications nevertheless undermine the interactive effect posited above (and Hypothesis 3), at least to a degree. Thus, the empirical evidence for Hypothesis 3, while generally consistent with this hypothesis, appears to be somewhat sensitive to the composition of autocracy-IEAs included within one's sample, and therefore may be less robust than the empirical evidence for Hypotheses 1 and 2 (discussed above and in Chapter 3).

4.3 Conclusion

This Chapter examines the third and final hypothesis that was derived from the formal model presented in Chapter 2, which contended that an autocracy's ratification of an IEA—and its subsequent membership therein—should uniquely decrease the likelihood of authoritarian regime-failure among constitutionally unconstrained autocracies *as industry dependence increases*. To empirically test this hypothesis, I created a novel data set of *monthly* authoritarian regime failures (1972-2010) and examined the effects of *IEA Membership* (conditional upon

[1] And hence supported Hypotheses 1 and 2.



(a) Small Model Specification **(b)** Large Model Specification

Figure 4.14: Marginal Effect of IEA Ratification on Pr(Authoritarian Regime Failure)—Unconstrained Authoritarian Regimes, Second Random Sample

Brown Industry and *Constitutional Constraints*) on this probability of *Authoritarian Failure*. Because *IEA Membership* was most likely an endogenous regressor within this analytical framework, I evaluated my binary outcome of interest (*Authoritarian Failure*) within a series of bivariate probit model specifications that simultaneously estimated (i) the effects of *Brown Industry*, *Constitutional Constraints*, and *ConstraintXIndustry* on *IEA Membership* (while controlling for a variety of covariates identified within Chapter 3) and (ii) the potential for a correlation between this latter process and that of *Authoritarian Failure*. Of note here, this approach allowed me to also reevaluate a number of the earlier testable implications from my formal theory, in addition to directly testing Hypothesis 3. Indeed, by explicitly modeling *IEA Membership* as a secondary dependent variable, the bivariate probit models presented above thereby allowed for a secondary, indirect test of Hypothesis 1 and 2.

Using a variety of control variable specifications, sampling techniques, and robustness tests, I found strong support for each Hypothesis. Regarding Hypothesis 3 specifically, my primary findings suggest that, for constitutionally unconstrained authoritarian regimes, *IEA Membership* raises an autocrat's probability

of survival as that autocrat's dependence on brown industry increases. Thus, not only does IEA ratification serve as a credible signal of (constitutionally unconstrained, highly industry dependent) autocrats' commitments-to-compensation, it also commits these very same leaders to actually providing this compensation ex-post to an IEA's ratification, thereby ensuring that industry leaders spend less to oppose such autocrats (post IEA-ratification). As a result of this latter phenomenon, my formal theory and the empirical tests presented above together suggest that constitutionally unconstrained, highly industry dependent autocrats will accordingly experience longer tenures in office when they choose to join IEAs.

By contrast, the empirical tests presented above also demonstrate that these dynamics do not arise among more constitutionally constrained authoritarian leaders, which is consistent with the notion (also arising from the formal model presented above) that constitutionally constrained authoritarian regimes will be unable to use *IEA Membership* to tie their hands to the provision of cost-offsetting compensation, ex-post to an IEA's ratification. Finally, the estimated marginal effects of *Brown Industry*, *Constitutional Constraints*, and *ConstraintXIndustry* within the *IEA Membership* equation of the bivariate probit models presented above similarly reinforce the hypotheses and conclusions of Chapter 3. Specifically, these latter findings imply that increases in *Brown Industry* dependence will compel constitutionally unconstrained authoritarian regimes to pursue *IEA Membership* more vigorously, while leading constitutionally constrained authoritarian regimes to delay (or avoid) *IEA Membership*—which, as mentioned above, are both consistent with the expectations of Hypothesis 1 and 2.

These findings offer several important contributions to our understandings of authoritarian governments, international (environmental) cooperation, and political regime failures. In demonstrating that membership within international (environmental) treaties may affect the survival of (some) authoritarian regimes (by tying the hands of unconstrained autocrats to provide compensation to industry owners), this Chapter's analysis contradicts a recurrent theme within international institutions research: namely that international institutions do not have the ability to directly constrain states from acting upon their own self interests (23, 26). In this regard, the theoretical argument and findings presented above together support a growing body of international relations research

that argues—and finds—that international institutions can effectively tie political leaders' hands in a manner that enables such leaders to make credible domestic commitments to influential interest groups (62, 325, 326). Similarly, the above results also reinforce a related, and emerging strain of research on IEAs, which has recently begun to recognize that IEAs often "matter" not because they effectively compel all member countries to comply with their intended environmental mandates, but rather, because the constraints that these IEAs impose on member countries—and the information that these constraints signal about leaders' time horizons and political preferences—often have sizable unintended and unforseen effects in other areas of political-economic interaction (327, 328, 329).

Building upon this latter point, and in line with recent research on human rights agreements (289, 810), this Chapter's results specifically suggest that global IEAs, in their efforts to achieve (near) global participation, may have the unintended consequence of prolonging (some) authoritarian leaders' survival in office. Indeed, as argued above, authoritarian governments—and especially constitutionally unconstrained authoritarian regimes—generally lack the necessary domestic institutional mechanisms for making credible commitments to domestic groups (187, 330, 153). Yet, their survival is frequently dependent on their ability to make such promises (260, 331). Based on the above results, international institutions, and IEAs in particular, may accordingly provide constitutionally unconstrained authoritarian regimes with the "best of both worlds"; allowing these regimes to reap the benefits of low domestic institutional constraints while simultaneously providing such governments with the capabilities to make credible domestic commitments. Given authoritarian regimes' comparatively poor track records—relative to democracies—in (i) complying with international institutions (e.g., 332, 333) and (ii) promoting domestic environmental quality (e.g., 73, 77), the inclusion of authoritarian regimes in global IEAs, and the resultant authoritarian regime-prolonging effects that this inclusion may cause, may offset any environmental gains to be had from, e.g., eliciting authoritarian country participation within IEAs in the first place.[1] Consequently, an important area of future research would be the undertaking of an overall assessment of what the

[1]Which, for example, manifests itself through an IEA's need to elicit full global cooperation to effectively solve the environmental problems that it was created to address (40, 574).

consequences of these dynamics may be for the environmental quality of these authoritarian countries (and the world as a whole)—an issue I revisit in the conclusion.

4.4 Analysis Appendix

The following appendix presents a series of auxiliary Tables and Figures that are intended to supplement and support the primary analysis presented above.

Table 4.1: Bivariate Probit Models of Authoritarian Survival & IEA Membership

	Authoritarian Regime Failure	IEA Membership	Authoritarian Regime Failure	IEA Membership
IEA Member	0.219		0.290	
	(0.275)		(0.279)	
Indust Dependence	0.019*	0.005***	0.001	0.0002
	(0.005)	(0.001)	(0.006)	(0.001)
Const. Constraints	0.150**	0.133***	0.133*	0.0768***
	(0.063)	(0.009)	(0.074)	(0.010)
ConstraintXIndustry	-0.001	-0.003***	-0.00004	-0.002***
	(0.002)	(0.0002)	(0.002)	(0.0002)
ConstraintXIEA	-0.134		-0.164*	
	(0.086)		(0.092)	
IndustryXIEA	-0.018**		-0.018**	
	(0.007)		(0.007)	
ConstraintXIndustryXIEA	0.005**		0.006**	
	(0.002)		(0.002)	
Other IEA Memberships	0.013**		0.038***	
	(0.006)		(0.009)	
GDP pc	-0.165***	0.062***	-0.237***	0.078***
	(0.026)	(0.005)	(0.034)	(0.006)
Resource Dependence	-0.007***		-0.009***	
	(0.001)		(0.002)	
Exec. Competitiveness		-0.196***	0.262***	-0.236***
		(0.010)	(0.049)	(0.011)
Parreg		-0.300***	0.013	-0.300***
		(0.008)	(0.0527)	(0.010)
Parcomp		0.067***	-0.077**	0.003
		(0.006)	(0.039)	(0.008)
FDI			0.002	
			(0.004)	
Conflict			0.001	
			(0.037)	
Cold War			0.221***	
			(0.082)	
GDP growth			-0.008**	
			(0.003)	
Natural Disasters			-0.007	
			(0.005)	
t^1	-0.017***		-0.016***	
	(0.002)		(0.002)	
t^2	0.0001***		0.0001***	
	(1.26e-05)		(1.27e-05)	
t^3	-1.95e-07***		-1.80e-07***	
	(2.63e-08)		(2.53e-08)	
Trade Dependence		-0.0003***		-0.001***
		(7.92e-05)		(9.13e-05)
Regional Ratification				2.781***
				(0.016)
ρ	0.151***	0.151***	0.099**	0.099**
	(0.050)	(0.050)	(0.045)	(0.045)
Constant	-1.554***	-0.698***	-1.264***	-1.052***
	(0.304)	(0.0692)	(0.368)	(0.080)
Observations	169,971	169,971	160,371	160,371
ll	-93437	-93437	-69771	-69771

Note: Robust standard errors in parentheses. IEA, Authoritarian regime-type, & Region FE's included in both stages of each model. *** p<0.01, ** p<0.05, * p<0.1

Table 4.2: Bivariate Probit Models of Authoritarian Survival & IEA Membership (20% Random Sample)

	Authoritarian Regime Failure	IEA Membership	Authoritarian Regime Failure	IEA Membership
IEA Member	0.304		0.289	
	(0.610)		(0.652)	
Indust Dependence	0.005	0.021***	0.002	0.016***
	(0.012)	(0.001)	(0.014)	(0.002)
Const. Constraints	-0.067	0.351***	-0.082	0.325***
	(0.146)	(0.023)	(0.176)	(0.027)
ConstraintXIndustry	0.004	-0.008***	0.003	-0.008***
	(0.003)	(0.001)	(0.004)	(0.001)
ConstraintXIEA	-0.053		-0.101	
	(0.219)		(0.238)	
IndustryXIEA	-0.0254*		-0.0212	
	(0.015)		(0.017)	
ConstraintXIndustryXIEA	0.005		0.006	
	(0.005)		(0.006)	
Other IEA Memberships	0.003		0.013	
	(0.013)		(0.018)	
GDP pc	-0.195***	0.133***	-0.322***	0.074***
	(0.068)	(0.013)	(0.085)	(0.015)
Resource Dependence	-0.009***		-0.011***	
	(0.003)		(0.004)	
Exec. Competitiveness		-0.309***	0.240***	-0.311***
		(0.022)	(0.081)	(0.026)
Parreg		-0.369***	-0.156	-0.231***
		(0.019)	(0.153)	(0.022)
Parcomp		0.190***	-0.098	0.199***
		(0.013)	(0.108)	(0.016)
FDI			-0.001	
			(0.008)	
Conflict			0.061	
			(0.080)	
Cold War			0.058	
			(0.151)	
GDP growth			-0.005	
			(0.007)	
Natural Disasters			-0.024*	
			(0.013)	
t	-0.020***		-0.017***	
	(0.004)		(0.004)	
t^2	0.0001***		0.0001***	
	(2.92e-05)		(3.17e-05)	
t^3	-2.64e-07***		-2.28e-07***	
	(6.56e-08)		(6.83e-08)	
Trade Dependence		-0.002***		-0.004***
		(0.0002)		(0.0002)
Regional Ratification				2.945***
				(0.041)
ρ	0.132*	0.132*	0.034	0.034
	(0.078)	(0.078)	(0.080)	(0.080)
Constant	-0.666	-0.965***	0.608	-1.385***
	(0.759)	(0.187)	(0.827)	(0.190)
Observations	35,922	35,922	33,902	33,902
ll	-18852	-18852	-14472	-14472

Note: Robust standard errors in parentheses. IEA, Authoritarian regime-type, & Region FE's included in both stages of each model. *** p<0.01, ** p<0.05, * p<0.1

4.5 Data Appendix

This appendix presents my monthly coding scheme for authoritarian regime spells. In doing so, I first advance an argument as to why one should code and analyze authoritarian regime transitions at the monthly level (rather than, e.g., at the yearly level). Here, I follow new research into the nature and measurement of authoritarian regime transitions (179, 184, 288), and define an authoritarian regime transition as any transition, violent or otherwise, that leads to the replacement of a ruling authoritarian regime by either (i) another authoritarian (or warlord) regime (ii) a foreign occupation or (iii) a democratic system of governance. Subsequent to these arguments, the current appendix then describes the sources that were used to code authoritarian regime persistence and failure to the monthly level, giving particular attention to (179, 184). After this description, I summarize in detail my particular coding decisions, and highlight—with arguments—those instances where my coding decisions diverge from those used by (179, 184). Finally, I present an actual table of my resultant monthly authoritarian regime spells, along with alternate start and end dates where appropriate, in order to aid future researchers in comparable endeavors.

As opposed to the commonly held practice of assessing authoritarian regime failure at the *yearly* level of analysis (286, 287, 288, 289, 290, 293), my assessments and codings of authoritarian regime transitions—presented above and below—are at the monthly level. I chose the latter approach over the former for several interrelated reasons. First, it is worth noting that authoritarian regime transitions themselves are rapidly occurring events,[1] often arising with little forewarning,[2] and taking place during instances of domestic (or intranational) turbulence that

[1] In Paraguay, for instance, as Kirsch and Osterling observe, "[l]ate on the night of February 2, 1989, General André Rodríguez [...] launched a surprise coup against Paraguay's President Alfredo Stroessner. By the next day, Stroessner's 35-year-old dictatorship had been overthrown and a new government sworn in." (334, 297). Spain is often similarly noted for its rapid transition to democracy (335), as are Nigeria (336) and numerous Eastern European countries (337).

[2] For example, as Kuran notes, "Like many major revolutions in history, the East European Revolution of 1989 caught its leaders, participants, victims, and observers by surprise" (338, 7). Similarly, the authoritarian collapses that occurred during the Arab Spring (339), the end of Soviet rule (340), and several African coup d'états (341, 342, 343) serve as additional examples of authoritarian regime transitions that took citizens, scholars, and policymakers by surprise.

are remarkably difficult to rekindle once dissipated (260, 344). Capturing these fast moving targets effectively should be of interest to any scholar concerned with explaining or predicting authoritarian transitions, and there is good reason to believe that yearly levels of analysis are far too crude to capture the evolution and precise occurrence of such events. Most clearly, yearly aggregations will fail to distinguish between events occurring at different periods of a calender year. For example, the December 1990 ousting of Bangladesh's personalist dictatorship (184) and the January/February 1990 authoritarian regime transitions in Yugoslavia, Nicaragua, and Benin (184) will be coded as occurring at the same point in time (1990) within yearly aggregations, even though these events actually took place approximately one year apart. In addition to the problems that this causes for the proper temporal sequencing of regime transition events and their causes (described further below), collapsing events by year in this fashion can dramatically increase the number of 'tied events' in one's sample—a type of measurement error that is known to be problematic for several prominent event history analysis techniques (345).

Perhaps more problematically for the sample at hand, yearly coding decisions will also add an additional layer of distortion to the measurement of *short-lived* authoritarian regimes. This is because not only do yearly measures of regime duration typically code an 'end event' back to the start of the calender year when it occurs, they also code the 'begin year' of a regime forward to the first *full* calender year of that regime's spell. Hence, yearly codings of authoritarian regime spells in (12/1980-11/1982) Burkina Faso and (3/1986-9/1988) Haiti would be recorded as 1981-1982 and 1987-1988, respectively, thereby reducing the true temporal length of these regimes (in months) by upwards of 50%-60%. For the approximately 20 post-WWII authoritarian regimes that lasted for *under* one year,[1] yearly aggregations will instead *overestimate* these regimes' (monthly) durations for similar reasons, in some cases by as much as 1000%. Finally, these yearly coding decisions are even more problematic for those countries that have experienced multiple authoritarian transitions in a single year, which arguably was the case for 1974 Cyprus (346), 1975 Bangladesh (184, 347), 2006 Fiji (348,

[1]As reported by (179, 184), and not including provisional, foreign occupied, or warlord spells.

212), 1982 Panama (184, 349, 350, 3328), 1998 Sierra Leone (184, 350, 3735), and 1978 Yemen (184, 351, xxii).[1]

The adverse implications of these aggregation distinctions become clearer still once one begins to assess the effects of (temporally varying) covariates on authoritarian survival—as was the case for the chapter presented above. For instance, and similar to the aggregation cases discussed above, yearly aggregations can severely distort the temporal proximity of (i) authoritarian transitions and (ii) the near simultaneous events that precipitated such transitions, especially when the latter are lagged one year within time series cross-sectional (TSCS) regression model frameworks. Indeed, the November 1992 onset of presidential elections in (then authoritarian) Madagascar, which led to a peaceful democratic transition over the ensuing three months, would be coded as occurring *two years prior* to this transition (if elections were lagged one year in one's regression model, i.e., as occurring in 2001) based upon the 2003 Madagascar regime transition-year recorded in (179, 184). Similarly, the autocratic regime change that followed the April 1999 Comoran coup d'état would be recorded as occurring two years subsequent to (a one-year lagged measure of) Comoran President Mohamed Taki Abdoulkarim's November 1998 death by heart attack—which arguably precipitated the series of events that led to the 1999 Comoran coup d'état five months later. As these examples suggest, yearly analyses of autocratic regime transitions will often fail to accurately model (and hence evaluate) the effects of key regime change predictors, especially when such predictors are themselves (i) highly variable from month-to-month and (ii) near immediate in their effects on authoritarian regime stability. Extant research—and/or the very nature of a given predictor—suggests that a wide variety of commonly studied authoritarian regime change correlates, including rebel violence (352, 353), popular uprisings (354, 355, 356), (domestic and international) economic volatility (357, 358, 83), government defections (356, 359, 360), elections (356, 359), treaty ratification,[2] and weather shocks (361), meet one or both of these criteria. Hence, if political-economic events do affect the probability of violent or non-violent authoritarian transition, then our

[1] See Table 4.3 below for more details.

[2] See Chapter 3, above.

ability to effectively test and evaluate whether or not these relationships exist will rest upon our use of monthly (or weekly) levels of analysis.[1]

To code monthly authoritarian regime spells, I build upon the regime coding scheme recently developed by Geddes, Wright, and Frantz (hereafter, GWF; 179) to code (yearly) authoritarian regime spells, while also drawing from the regime start and end events (and dates) provided within their corresponding codebook (184). Using the authoritarian regime typologies developed by Geddes (255) and extended by Wright (165), GWF code the start and end years of authoritarian regimes (1945-2010), and also record each subsequent regime type (184). Unlike past datasets that treat authoritarian regimes as lasting from the start of an authoritarian regime until democratization (e.g., 7), the approach presented in GWF (179, 184) records within-authoritarian-spell regime-transitions, and hence allows one to more accurately assess the true duration of specific authoritarian regimes (179, 184).[2] The authors do so by identifying authoritarian regime transition events,[3] and then separately identify (authoritarian) regimes as ending and beginning at each event and code each corresponding regime's institutional type. Given that my authoritarian regime survival theory (presented above) relates to all instances of authoritarian regime failures—not just to instances of democratization—I therefore favored the coding scheme developed by GWF (179, 184) over the schemes used by others (e.g., 7, 111), and I then set about converting these recorded authoritarian spells to the monthly, rather than year, level of analysis.

To do so, I first identified the complete set of authoritarian regimes (included in GWF) that existed during some portion of the January 1972 to December

[1]Given that authoritarian regimes typically last from anywhere between 3-months to several decades, improvements in the accuracy of authoritarian regime-spell measurement (arising when moving from yearly to monthly data—as highlighted in the paragraph above) are an order of magnitude larger than are comparable improvements achieved under shifts from monthly aggregations to weakly or daily aggregations. Thus, monthly aggregations are favored over weekly or daily aggregations in the analysis above.

[2]For instance, the Central African Republic (CAR) is often coded as having a single authoritarian spell lasting from independence (in 1961) to its first experience with democratization (in 1993), whereas GWF record this authoritarian spell as actually being composed of four distinct authoritarian regimes (1961-1965; 1966-1979; 1980-1981; 1982-1993), each beginning with a violent Coup d'état that deposed the previous regime (184).

[3]Wherein an end-event marks a change in a government's set of formal and/or informal rules for choosing leaders and policies (184).

2010 time period, as the IEA ratification data (and a number of related economic controls) presented in Chapters 3 and 4 only cover these years. Consistent with the *begin* measure in GWF, I then assigned each regime a start month (and year) that corresponded to the first full month of a regime's lifespan. Hence, if an authoritarian regime seized power on May 25th 1972 by coup d'état, its start year-month was recorded as June 1972. For authoritarian regimes in the sample that began before January 1972, their pre-1972 start year-month was adjusted in the same manner, and is also recorded below. The end months for authoritarian regimes then indicate the final (partial) year-month of an authoritarian regime's existence. Hence if an authoritarian regime was deposed by coup d'état on September 14th 2002, its end month is recorded as September 2002. The vast majority of start and end months for the authoritarian regimes reported in Table 4.3[1] were drawn from the events (and dates) listed in the "Autocratic regime Start and End events" section of (184).

However, there are also several key differences—beyond the level of temporal aggregation—between the authoritarian regime spell codings reported below and those included in (179, 184). First, I add 17 additional countries (resulting in approximately 44 unique authoritarian regime spells) to GWF's sample frame of autocracies.[2] These countries were not included in GWF due to their small population size (184), but are nevertheless highly relevant to the study at hand—and likely to future studies of authoritarian regime durability. Using a number of sources (listed below), I specifically record all possible or probable instances of authoritarian regime transition (and make note of each specific transition event) for each of these 17 additional countries, along with their specific start and end months.[3] Second, my coding rules also diverge from GWF in my treatment of elections as a regime transition indicator. GWF consider an authoritarian regime

[1]Specifically, any event without an additional reference, footnote, or citation in Table 4.3 was coded from the event summaries in (184), although these were also checked against online sources.

[2]These countries are: Bahrain, Bhutan, Brunei Darussalam, Comoros, Cyprus, Djibouti, Equatorial Guinea, Fiji, Grenada, Guyana, Maldives, Qatar, Samoa, Sao Tome and Principe, Seychelles, Suriname, and Tonga.

[3]The GWF Regime types for each corresponding spell are accordingly listed as "NA" for periods of autocratic rule and "democracy" for periods of democratic rule, the latter according to (7).

as having ended by election when a "competitive election for the executive, or for the body that chooses the executive, occurs and is won by a person other than the incumbent or someone allied with the incumbent; and the individual or party elected is allowed to take office. The end date is the election, but the case is only counted if the candidate or party elected is allowed to take power," (184, 7). However, in cases where a runoff election was required, they date the runoff election as the end event (184), rather than the date of the initial election. While the consequences of this latter decision are negligible for yearly aggregations, they can significantly impact the monthly coding of authoritarian regime end events. Hence, and given that hindsight is already in play with this election coding approach, I normalize all election end events to the month in which the initial national election occurred.

However, I also record each runoff election month-date, where applicable, as an "Alternate" end month-year for the monthly authoritarian regime spells presented below. This highlights the third and final major divergence between the monthly regime spells listed below and the yearly authoritarian regime spells presented in (179, 184): given the inherent uncertainty surrounding the specific end month of a given authoritarian regime, I report below a set of alternative end events, spells, and months for a number of authoritarian regimes. Here, I first separately include GWF's coded spells of foreign occupation, warlordism, and provisional governments—along with their specific end months and events—as these spells are often treated as temporal extensions to authoritarian regimes in other authoritarian regime coding schemes (7, 184). Second, wherever there were multiple possible authoritarian end events, I provided direct secondary events (along with their corresponding months) as Alternate end events in footnotes below. As was the case for the GWF election end event coding decisions (described above), yearly aggregations of authoritarian spells are unlikely to be highly sensitive to one's choice of end event, as the set of all possible end events to a given authoritarian transition likely occur over the span of several months. Monthly aggregations, on the other hand, will reflect these end event decisions precisely, and will vary accordingly. To address this concern, every possible Alternate end event for a given authoritarian regime spell was identified and included as such

below, with proper citation and date. As highlighted in the robustness analysis above, these alternate end events allow scholars to assess the robustness of any significant monthly authoritarian regime survival findings to specific coding decisions of authoritarian regime's end months.

The actual table presented below includes five columns. Countries' names are listed in column one, GWF's authoritarian regime type codings are listed in column 2, along with GWF's intermediate regimes (e.g., foreign occupied, provisional) and CGV's democracy codings, where applicable. Columns three and four then provide the primary start and end months to a given regime. Column five gives a rough description of the actual end events that led to an authoritarian regime's transition, taken from GWF (184) or online sources such as the New York Times, Lexis Nexis, or Wikipedia. These end events are not meant to serve as a definitive event typology for the authoritarian regime end events, but rather, are simply intended to provide a means to corroborate which of the many (often overlapping) events were used to distinguish a primary end event for a given authoritarian regime. Finally, as mentioned above, end events are appended with footnotes indicating potential Alternate end events wherever an authoritarian regime transition was found to have multiple possible end events.

Table 4.3: Monthly End Dates for Authoritarian Regimes (1972-2010)

Country	**GWF Regime**	**Begin**	**End**	**End Event**
Afghanistan	monarchy	11/1929	7/1973	Coup d'état
Afghanistan	personal	8/1973	4/1978	Coup d'état
Afghanistan	sppersonal	5/1978	4/1992	Collapse of incumbent party - capital falls
Afghanistan	warlord	5/1992	9/1996	Overthrow of incumbent - capital falls
Afghanistan	sparty	10/1996	11/2001	Foreign overthrow of incumbent - capital falls
Afghanistan	foreign-occupied	12/2001	8/2009	National election[1]

Continued on next page

[1]Alternate: 11/2009: Candidate withdraws from runoff election (362).

Country	GWF Regime	Begin	End	End Event
Afghanistan	personal	9/2009		
Albania	sparty	12/1944	3/1991	National elections resulting in coalition cabinet[1]
Albania	democracy	4/1991		
Algeria	spmilitary	8/1962	1/1992	Coup d'état
Algeria	military	2/1992		
Angola	sparty	12/1975		
Argentina	military	7/1966	3/1973	National elections
Argentina	democracy	4/1973	3/1976	Coup d'état
Argentina	military	4/1977	10/1983	National elections
Argentina	democracy	11/1984		
Armenia	democracy	12/1991	9/1996	Rigged elections
Armenia	personal	10/1996	2/1998	Incumbent forced to step down
Armenia	personal	3/1998		
Azerbaijan	personal	11/1991	5/1992	Popular ouster of incumbent[2]
Azerbaijan	democracy	6/1992	6/1993	Coup d'état
Azerbaijan	personal	7/1994		
Bahrain	NA	9/1971	12/1973	National election[3]
Bahrain	NA	1/1974	8/1975	Incumbent dissolves national assembly[4]
Bahrain	NA	9/1975	10/2002	National elections[5]
Bahrain	NA	11/2002		
Bangladesh	sppersonal	1/1972	8/1975	Coup d'état[6]
Bangladesh	personal	9/1975	3/1982	Coup d'état
Bangladesh	personal	4/1982	12/1990	Forced resignation
Bangladesh	democracy	1/1991	1/2007	Military imposes caretaker government

Continued on next page

[1]See (363, 467-545). Alternate: 6/1991: Resignation of incumbent assembly in response to uprising (184).

[2]Alternate: 6/1992: National elections (364).

[3]Parliamentary elections held on 12/12/1973 (364).

[4]See (365).

[5]See (366). Alternate: 2/2002: Adoption of national action charter (367).

[6]Alternate: 11/1975: Military uprisings lead to subsequent head of state resigning, and restructuring of power (347).

Country	GWF Regime	Begin	End	End Event
Bangladesh	military	2/2007	12/2008	National elections
Bangladesh	democracy	1/2009		
Belarus	personal	9/1991	6/1994	National elections[1]
Belarus	personal	7/1994		
Benin	provisional	6/1970	10 /1972	Coup d'état
Benin	personal	11/1972	2/1990	National conference declares sovereignty, replaces incumbent
Benin	provisional	3/1990	3/1991	National elections
Benin	democracy	4/1991		
Bhutan	NA	1/1908	12/2007	National election[2]
Bhutan	NA	1/2008		
Bolivia	milpersonal	9/1971	11/1978	Coup d'état
Bolivia	provisional	12/1978	7/1980	Coup d'état
Bolivia	military	8/1980	8/1981	Forced resignation
Bolivia	military	9/1981	10/1982	Democratic leader reappointed
Bolivia	democracy	11/1982		
Bosnia and Herzegovina	warlord	4/1992	12/1995	Signing of Dayton Agreement, start of foreign occupation
Bosnia and Herzegovina	foreign-occupied	1/1996		
Botswana	sparty	10/1966		
Brazil	military	5/1964	1/1985	National elections
Brazil	democracy	2/1985		
Brunei Darussalam	NA	2/1984		
Bulgaria	sparty	10/1944	11/1989	Incumbent resigns[3]
Bulgaria	democracy	7/1990		
Burkina Faso	personal	2/1966	11/1980	Coup d'état
Burkina Faso	military	12/1980	11/1982	Coup d'état

Continued on next page

[1]First round of presidential elections held on 6/23/1994 (364). Alternate: 7/1994: subsequent runoff elections (184).

[2]National council polls held on 12/31/2007 (368). Alternate: 3/2008: lower house ("main") elections (369).

[3]See (370, 114). Alternate: 6/1990: National elections (180). Alternate II: 8/1990: Non Partisan Prime Minster Chosen (184).

Country	GWF Regime	Begin	End	End Event
Burkina Faso	personal	12/1982	10/1987	Coup d'état
Burkina Faso	personal	11/1987		
Burundi	spmilitary	8/1966	9/1987	Coup d'état
Burundi	military	10/1987	6/1993	National elections
Burundi	democracy	7/1994	7/1996	Coup d'état
Burundi	milpersonal	8/1996	4/2003	Peaceful handover of power to vice-president
Burundi	provisional	5/2003	8/2005	National elections
Burundi	democracy	9/2005		
Cambodia	personal	4/1970	4/1975	Incumbent resigns
Cambodia	sparty	5/1975	1/1979	Foreign removal of incumbent - capital falls
Cambodia	sparty	2/1979		
Cameroon	sppersonal	2/1960	11/1982	Incumbent resigns[1]
Cameroon	personal	12/1982		
Cen African Rep	personal	1/1966	9/1979	Foreign coup d'état
Cen African Rep	personal	10/1979	9/1981	Coup d'état
Cen African Rep	milpersonal	10/1981	9/1993	National elections
Cen African Rep	democracy	10/1993	3/2003	Coup d'état
Cen African Rep	personal	4/2003		
Chad	sppersonal	9/1960	4/1975	Coup d'état
Chad	military	5/1975	2/1979	Coup d'état[2]
Chad	warlord	3/1979	6/1982	Coup d'état
Chad	personal	7/1982	11/1990	Coup d'état[3]
Chad	personal	12/1990		
Chile	democracy	8/1932	9/1973	Coup d'état
Chile	milpersonal	10/1973	12/1989	National elections
Chile	democracy	1/1990		
China	sparty	2/1949		
Comoros	NA	8/1975	8/1975	Coup d'état[4]

Continued on next page

[1]See (371, 181). Alternate: 8/1983: Consolidation of power by successor to incumbent (184).

[2]See (372, 81). Alternate 3/1979: Foreign forces take capital (184).

[3]Coup begins in November, and incumbent ultimately flees country on 11/30/1990 (181, 220). Alternate 12/1990: Insurgency ousts incumbent (184).

[4]See (181, 373, 374, 139).

Country	GWF Regime	Begin	End	End Event
Comoros	NA	9/1975	1/1976	Coup d'état[1]
Comoros	NA	2/1976	5/1978	Coup d'état[2]
Comoros	NA	6/1978	11/1989	Coup d'état[3]
Comoros	NA	12/1989	9/1995	Coup d'état[4]
Comoros	NA	10/1995	4/1999	Coup d'état[5]
Comoros	NA	5/1999	4/2006	National elections[6]
Comoros	NA	5/2006		
Congo/Zaire	personal	10/1960	5/1997	Foreign removal of incumbent, incumbent flees country
Congo/Zaire	personal	6/1997		
Congo-Brz	spmilitary	10/1968	2/1991	National congress strips incumbent's powers, chooses successor
Congo-Brz	provisional	3/1991	8/1992	National elections
Congo-Brz	democracy	9/1992	10/1997	Rebel and foreign removal of incumbent
Congo-Brz	personal	11/1998		
Cuba	sppersonal	2/1959		
Cyprus	NA	9/1960	11/1963	Constitutional amendments proposed by incumbent[7]
Cyprus	NA	12/1963	7/1974	Coup d'état[8]
Cyprus	NA	8/1974	12/1974	Incumbent steps down, pre-coup incumbent reinstated[9]
Cyprus	NA	1/1975	2/1983	National elections[10]

Continued on next page

[1]See (181, 241).
[2]See (181, 241).
[3]See (181, 242).
[4]See (181, 244).
[5]See (181, 246). Alternative: 11/1998: Incumbent dies of heart attack (181, 246).
[6]See (182).
[7]See (375, 32).
[8]See (346, 35).
[9]See (346, 35-36)
[10]See (180).

Country	GWF Regime	Begin	End	End Event
Cyprus	democracy[1]	3/1983		
Czechoslovakia	sparty	2/1948	12/1989	Peaceful resolution prompts incumbent to resign[2]
Czechoslovakia	democracy	3/1990	12/1992	Dissolution
Djibouti	NA	7/1977		
Dominican Rep	personal	7/1966	5/1978	National elections
Dominican Rep	democracy	6/1978		
Ecuador	personal	7/1970	2/1972	Coup d'état
Ecuador	military	3/1972	4/1979	National elections
Ecuador	democracy	5/1979		
Egypt	tthreat	8/1952		
El Salvador	spmilitary	1/1949	10/1979	Coup d'état[3]
El Salvador	NA[4]	11/1979	3/1982	National elections
El Salvador	indirect military	4/1982	3/1994	National elections
El Salvador	democracy	4/1994		
Equatorial Guinea	NA	11/1968	8/1979	Coup d'état [5]
Equatorial Guinea	NA	9/1979		
Eritrea	sppersonal	6/1993		
Ethiopia	monarchy	4/1899	9/1974	Coup d'état
Ethiopia	milpersonal	10/1974	5/1991	Coup d'état, incumbent flees country
Ethiopia	sparty	6/1991		
Fiji	NA	11/1970	5/1987	Coup d'état [6]

Continued on next page

[1]According to Cheibub, Gandhi and Vreeland (7).

[2]Alternate: 6/1990: National elections (180).

[3]Alternate: 4/1982: National elections (376).

[4]Note: (179) combine this period of authoritarian rule with the 1949-1979 "spmilitary" regime in El Salvador (listed above). I flag this period separately here because after Carlos Humberto Romero was removed in a 1979 military Coup d'état (377, 239), he was replaced by a military junta ("Revolutionary Government Junta of El Salvador") rather than by another military party head—and hence although the military maintained control of the government, there appeared to be a distinct break in the structure of said government's administrative institutions.

[5]See (378, 188).

[6]See (379, 243).

Country	GWF Regime	Begin	End	End Event
Fiji	NA	6/1987	5/2000	Coup d'état [1]
Fiji	NA	6/2000	12/2006	Coup d'état, incumbent reinstated but with significant military control [2]
Fiji	NA	1/2007		
Gabon	sppersonal	9/1960		
Gambia	sparty	3/1965	7/1994	Coup d'état
Gambia	personal	8/1994		
Georgia	personal	10/1991	1/1992	Coup d'état
Georgia	personal	2/1992	11/2003	Incumbent resigns after rigged elections
Georgia	provisional	12/2003	1/2004	National elections
Georgia	democracy	2/2004		
Germany East	sparty	11/1949	3/1990	Incumbent party loses competitive election
Ghana	democracy	9/1969	1/1972	Coup d'état
Ghana	military	2/1972	5/1979	Coup d'état[3]
Ghana	democracy	6/1979	12/1981	Coup d'état
Ghana	personal	1/1982	12/2000	National elections
Ghana	democracy	1/2001		
Greece	military	5/1967	7/1974	Military transfer of power[4]
Greece	democracy	8/1974		
Grenada	NA	3/1979	10/1983	Coup d'état [5]
Grenada	democracy[6]	11/1983	10/1983	
Guatemala	military	4/1970	11/1985	National elections[7]
Guatemala	indirect military	12/1985	11/1995	National elections
Guatemala	democracy	12/1995		

Continued on next page

[1] See (348, 380, 212).

[2] See (348, 212).

[3] Alternate: 6/1979: National elections (381). Alternate II: 07/1979: Runoff-election (184)
.

[4] Alternate: 11/1974: National elections (180).

[5] See (382, 248).

[6] According to Cheibub, Gandhi, and Vreeland (7).

[7] Alternate: 12/1985: Runoff-election (184).

Country	GWF Regime	Begin	End	End Event
Guinea	sparty	11/1958	3/1984	Incumbent's natural death followed by Coup d'état
Guinea	personal	4/1984	12/2008	Natural death
Guinea	personal	1/2009	1/2010	Hand over of power to transitional government[1]
Guinea Bissau	sparty	9/1974	11/1980	Coup d'état
Guinea Bissau	personal	12/1980	5/1999	Incumbent's forces surrender to opposition forces[2]
Guinea Bissau	provisional	6/1999	11/1999	National elections
Guinea Bissau	democracy	12/1999	11/2002	Incumbent dissolves parliament (Auto-Coup d'état)
Guinea Bissau	personal	12/2002	9/2003	Coup d'état
Guinea Bissau	provisional	10/2003	6/2005	National elections
Guinea Bissau	democracy	7/2005		
Guyana	NA	6/1966	10/1992	National elections[3]
Guyana	NA	11/1992		
Haiti	personal	7/1957	2/1986	Incumbent flees country
Haiti	military	3/1986	9/1988	Coup d'état
Haiti	milpersonal	10/1988	3/1990	Military hands over power to interim government[4]
Haiti	democracy	4/1990	9/1991	Coup d'état
Haiti	military	10/1991	10/1994	Democratically elected leader reinstated
Haiti	democracy	11/1994	1/1999	Incumbent dissolves parliament (Auto-Coup d'état)
Haiti	personal	2/1999	2/2004	Coup d'état

Continued on next page

[1]Alternate 6/2010: National elections (183). Alternate II: 11/2010: Runoff-election (184) .
[2]Alternate: 9/1999: Incumbent expelled from party congress (383).
[3]See (376).
[4]Alternate: 12/1990: National elections (376).

Country	GWF Regime	Begin	End	End Event
Haiti	provisional	3/2004	2/2006	National elections
Haiti	democracy	3/2006		
Honduras	democracy	4/1971	12/1972	Coup d'état
Honduras	military	1/1973	11/1981	National elections
Honduras	democracy	12/1981		
Hungary	sparty	3/1947	3/1990	National elections[1]
Hungary	democracy	4/1990		
Indonesia	tthreat	4/1966	6/1999	National elections[2]
Indonesia	democracy	7/1999		
Iran	monarchy	1/1926	1/1979	Incumbent flees country
Iran	sparty	2/1979		
Iraq	sppersonal	8/1968	7/1979	Incumbent resigns
Iraq	personal	8/1979	4/2003	Foreign occupation of capital
Iraq	foreign-occupied	5/2003	3/2010	National elections
Ivory Coast	sparty	9/1960	12/1999	Coup d'état
Ivory Coast	personal	1/2000	10/2000	National elections
Ivory Coast	personal	11/2000		
Jordan	monarchy	6/1946		
Kazakhstan	personal	1/1992		
Kenya	sparty	1/1964	12/2002	National elections
Kenya	democracy	1/2003		
Korea North	sppersonal	10/1948		
Korea South	military	2/1961	6/1987	Military implements reforms[3]
Korea South	democracy	7/1987		
Kuwait	monarchy	7/1961		
Kyrgyzstan	personal	9/1991	3/2005	Incumbent forced to resign
Kyrgyzstan	personal	4/2005		

Continued on next page

[1] Alternate: 4/1990: Runoff-election (184).
[2] Alternate: 10/1999: Incumbent withdraws candidacy for presidency (384).
[3] Alternate: 12/1987: National elections (385).

Country	GWF Regime	Begin	End	End Event
Laos	warlord	8/1962	2/1973	Treaty signed between competing warlord factions[1]
Laos	provisional	3/1973	11/1975	Abdication by king and resignation of PM
Laos	sparty	12/1975		
Lebanon	democracy	12/1943	6/1976	Foreign occupation
Lebanon	warlord/foreign-occupied	7/1976	5/2005	National elections
Lebanon	democracy	6/2005		
Lesotho	sparty	2/1970	1/1986	Coup d'état
Lesotho	military	2/1986	3/1993	National elections
Lesotho	democracy	4/1993		
Liberia	sppersonal	2/1944	4/1980	Coup d'état
Liberia	personal	5/1980	9/1990	Incumbent captured and executed
Liberia	warlord	10/1990	7/1997	National elections
Liberia	personal	8/1997	8/2003	Incumbent flees country
Liberia	provisional	9/2003	10/2005	National elections[2]
Liberia	democracy	11/2005		
Libya	personal	10/1969		
Madagascar	sparty	7/1960	5/1972	Incumbent hands over power to military
Madagascar	military	6/1972	6/1975	Personalist leader appointed to power by military junta[3]
Madagascar	personal	7/1975	11/1992	National elections[4]
Madagascar	democracy	12/1992	3/2009	Coup d'état
Madagascar	personal	4/2009		
Malawi	personal	8/1964	5/1994	National elections
Malawi	democracy	6/1994		

Continued on next page

[1] See (386, 175).
[2] Alternate: 11/2005: Runoff-election (184).
[3] Alternate: 12/1975: National referendum is approved (378, 309).
[4] Alternate: 02/1993: Runoff-election (184).

Country	GWF Regime	Begin	End	End Event
Malaysia	sparty	9/1957		
Maldives	NA	8/1965	10/2008	National elections[1]
Maldives	NA	11/2008		
Mali	personal	12/1968	3/1991	Coup d'état
Mali	provisional	4/1991	4/1992	National elections
Mali	democracy	5/1992		
Mauritania	personal	12/1960	7/1978	Coup d'état
Mauritania	personal	8/1978	8/2005	Coup d'état
Mauritania	military	9/2005	3/2007	National elections
Mauritania	democracy	4/2007	8/2008	Coup d'état
Mauritania	personal	9/2008		
Mexico	sparty	9/1915	7/2000	National elections
Mexico	democracy	8/2000		
Mongolia	sparty	7/1921	6/1993	National elections
Mongolia	democracy	7/1993		
Morocco	monarchy	4/1956		
Mozambique	sparty	7/1975		
Myanmar	milpersonal	4/1962	9/1988	Coup d'état and constitutional repeal
Myanmar	military	10/1988		
Namibia	sparty	4/1990		
Nepal	monarchy	3/1951	5/1991	Multiparty parliament established
Nepal	democracy	6/1991	10/2002	PM dismissed and power consolidated
Nepal	monarchy	11/2002	4/2006	Reinstatement of parliament[2]
Nepal	democracy	5/2006		
Nicaragua	personal	6/1936	7/1979	Incumbent flees country
Nicaragua	sparty	8/1979	2/1990	National elections
Nicaragua	democracy	3/1990		
Niger	sparty	9/1960	4/1974	Coup d'état
Niger	milpersonal	5/1974	7/1991	National Conference strips incumbent of power

Continued on next page

[1] See (387).

[2] Alternate: 5/2006: Parliament assumes full legislative power (388).

Country	GWF Regime	Begin	End	End Event
Niger	provisional	8/1991	2/1993	National elections
Niger	democracy	3/1993	11/1996	Rigged elections
Niger	personal	12/1996	4/1999	Coup d'état leading to establishment of transitional government[1]
Niger	democracy	5/1999		
Nigeria	military	8/1966	8/1979	National elections
Nigeria	democracy	9/1979	12/1983	Coup d'état
Nigeria	military	1/1984	6/1993	Annulment of elections[2]
Nigeria	milpersonal	7/1993	2/1999	National elections
Nigeria	democracy	3/1999		
Oman	monarchy	3/1742		
Pakistan	democracy	1/1972	9/1976	Amendment passed curtailing power of judiciary
Pakistan	personal	10/1976	7/1977	Coup d'état
Pakistan	milpersonal	8/1977	11/1988	National elections
Pakistan	democracy	12/1988	10/1999	Coup d'état
Pakistan	milpersonal	11/1999	2/2008	National elections[3]
Pakistan	democracy	3/2008		
Panama	milpersonal	11/1968	7/1982	Incumbent forced to resign[4]
Panama	milpersonal	8/1982	12/1989	Incumbent ousted by invading forces
Panama	democracy	1/1990		
Paraguay	tthreat	6/1954	5/1993	National elections
Paraguay	democracy	6/1993		
Peru	military	11/1968	5/1980	National elections
Peru	democracy	6/1980	4/1992	Auto-Coup d'état

Continued on next page

[1]Alternate: 10-11/1999: Initial and runoff-elections (184).

[2]See (389). Alternate: 8/1993: Incumbent forced to resign (184).

[3]See (390). Alternate: 8/2008: Resignation by incumbent under threat of impeachment (184).

[4]See (349, 350, 3328). Alternate: 3/1982: Coup d'état ousted prior incumbent (184).

Country	GWF Regime	Begin	End	End Event
Peru	personal	5/1992[1]	11/2000	Incumbent flees country and resigns
Peru	provisional	12/2000	4/2001	General elections
Peru	democracy	5/2001		
Philippines	democracy	7/1946	9/1972	Declaration of martial law
Philippines	personal	10/1972	2/1986	Incumbent flees country
Philippines	democracy	3/1986		
Poland	sparty	1/1945	6/1989	National elections
Poland	democracy	7/1989		
Portugal	personal	6/1926	4/1974	Coup d'état
Portugal	provisional	4/1974	4/1976	National elections
Portugal	democracy	5/1976		
Qatar	NA	10/1971[2]		
Romania	sppersonal	4/1945	12/1989	Incumbent flees capital and is apprehended
Romania	provisional	1/1990	5/1990	National elections
Romania	democracy	6/1990		
Russia	democracy	7/1991	9/1993	Incumbent attempts to dissolve parliament, parliament attempts to remove incumbent
Russia	personal	10/1993		
Rwanda	sparty	8/1962	7/1973	Coup d'état
Rwanda	milpersonal	8/1973	4/1994	Assassination[3]
Rwanda	spmilitary	5/1994		
Saudi Arabia	monarchy	6/1927		
Samoa	NA	2/1962	2/1982	National elections[4]
Samoa	NA	3/1982		

Continued on next page

[1]Alternate Start: 7/1992: One month after runoff-election (184).

[2]Note: successful coup d'états on 2/1972 and 6/1995 are not counted as regime transitions as these were intra-monarchy transitions (350, 3498).

[3]See (181, 870). Alternate: 7/1994: Rebels capture capital (184).

[4]The recently formed Human Rights Protection Party (HRPP) gains control of government, and is dominant party from this point forward (391).

Country	GWF Regime	Begin	End	End Event
Sao Tome and principe	NA	8/1975	3/1991	National elections[1]
Sao Tome and principe	democracy[2]	4/1991		
Senegal	sparty	9/1960	2/2000	National elections[3]
Senegal	democracy	3/2000		
Serbia	sppersonal	7/1991	10/2000	Incumbent is ousted/resigns
Serbia	democracy	11/2000		
Seychelles	NA	6/1976	6/1977	Coup d'état [4]
Seychelles	NA	7/1977	3/1979	Constitutional referendum passed declaring socialist state[5]
Seychelles	NA	4/1979		
Sierra Leone	sparty	7/1968	4/1992	Coup d'état
Sierra Leone	milpersonal	5/1992	2/1996	National elections[6]
Sierra Leone	democracy	3/1996	5/1997	Coup d'état
Sierra Leone	personal	6/1997	2/1998	Incumbent ousted by foreign troops [7]
Sierra Leone	democracy	4/1998		
Singapore	sparty	9/1965		
Somalia	personal	10/1969	1/1991	Incumbent flees country
Somalia	warlord	2/1991		
South Africa	oligarchy	6/1910	4/1994	National elections
South Africa	democracy	5/1994		
South Vietnam	military	12/1963	4/1975	Incumbent capitulation - capital falls
South Yemen	sparty	12/1967	5/1990	Unification with North Yemen
Soviet Union	sparty	12/1917	12/1991	Dissolution

Continued on next page

[1]See (381).
[2]According to Cheibub, Gandhi, and Vreeland (7).
[3]Alternate: 3/2000: Runoff-election (184).
[4]See (392, 18).
[5]See (350, 3724).
[6]Alternate: 3/1996: Runoff-election (184).
[7]Alternate: 3/1998: Democratic leader reinstated (350, 3735).

Country	GWF Regime	Begin	End	End Event
Spain	personal	4/1939	7/1976	Appointment of Prime Minister, and initiation of democratic reforms
Spain	provisional	8/1976	6/1977	National elections
Spain	democracy	7/1977		
Sri Lanka	democracy	3/1948	8/1978	Incumbent is granted autocratic powers
Sri Lanka	sparty	9/1978	10/1994	National elections
Sri Lanka	democracy	11/1994		
Sudan	personal	6/1969	4/1985	Coup d'état
Sudan	military	5/1985	4/1986	Competitive consistent assembly elections[1]
Sudan	democracy	5/1986	6/1989	Coup d'état
Sudan	personal	7/1989		
Suriname	NA	3/1980	11/1987	National elections[2]
Suriname	democracy[3]	12/1987	12/1990	Coup d'état[4]
Suriname	NA	1/1991	5/1991	National elections[5]
Suriname	democracy[6]	6/1991		
Swaziland	monarchy	10/1968		
Syria	tthreat	4/1963		
Taiwan	sparty	1/1950	3/2000	National elections
Taiwan	democracy	4/2000		
Tajikistan	personal	10/1991		
Tanzania	sparty	5/1964		
Thailand	milpersonal	10/1957	10/1973	Incumbent resigns
Thailand	provisional	11/1973	1/1975	National elections
Thailand	democracy	2/1975	10/1976	Coup d'état
Thailand	milpersonal	11/1976	7/1988	National elections
Thailand	democracy	8/1988	2/1991	Coup d'état

Continued on next page

[1] Alternate: 6/1986: Formation of coalition government (393, 52).
[2] See (376).
[3] According to Cheibub, Gandhi, and Vreeland (7).
[4] (394, 20).
[5] See (376).
[6] According to Cheibub, Gandhi, and Vreeland (7).

Country	GWF Regime	Begin	End	End Event
Thailand	military	3/1991	9/1992	National elections
Thailand	democracy	10/1992	9/2006	Coup d'état
Thailand	military	10/2006	12/2007	National elections
Thailand	democracy	1/2008		
Togo	personal	2/1967		
Tonga	NA	7/1970	7/2008	Monarch relinquishes power[1]
Tonga	NA	8/2008		
Tunisia	sparty	3/1956		
Turkey	military	10/1980	11/1983	National elections
Turkey	democracy	12/1983		
Turkmenistan	sppersonal	11/1991		
UAE	monarchy	1/1972		
Uganda	personal	2/1971	4/1979	Foreign invasion of capital, incumbent flees country
Uganda	provisional	5/1979	12/1980	National elections
Uganda	personal	1/1981	7/1985	Coup d'état
Uganda	warlord	8/1985	1/1986	New leader captures capital, is sworn into power
Uganda	personal	2/1986		
Uruguay	democracy	12/1942	6/1973	Congress dissolved, military regime established
Uruguay	military	7/1973	11/1984	National elections
Uruguay	democracy	12/1984		
Uzbekistan	sppersonal	10/1991		
Venezuela	democracy	1/1959	3/2005	Passage of policies restricting citizen rights
Venezuela	personal	4/2005		
Vietnam	sparty	8/1954		
Yemen	personal	12/1967	6/1974	Coup d'état
Yemen	military	7/1974	7/1978	Authoritarian purge.[2]

Continued on next page

[1] See (395, 4429).

[2] Alternate: 6/1978: Assassination of incumbent (351, xxii).

Country	GWF Regime	Begin	End	End Event
Yemen	personal	8/1978		
Yugoslavia	sparty	4/1945	1/1990	Dissolution
Zambia	sparty	3/1967	10/1991	National elections
Zambia	democracy	11/1991	5/1996	Passage of law limiting democratic opposition[1]
Zambia	sparty	6/1996		
Zimbabwe	not-independent	12/1965	2/1980	National elections[2]
Zimbabwe	sparty	3/1980		

[1]Alternate: 11/1996: Actual date of rigged elections (396, 45).

[2]See (397, 73). Alternate: 4/1980: Official independence under incumbent rule (184).

5

Conclusion

5.1 Summary

The introduction to this dissertation presented a compelling theoretical puzzle: why, given all that we know about authoritarian regimes and their generally poor environmental records, do we nevertheless observe *some* authoritarian governments ratifying international environmental agreements (IEAs) at speeds that greatly exceed those of other autocracies, and in some cases, even democracies? To answer this question, I began by conceptualizing an authoritarian country's decision to ratify an IEA (or not) as the end result of a domestic bargaining process arising between an authoritarian leader (i.e. an autocrat) and domestic "brown" industry owners. Herein, I assumed that autocrats stand to gain material benefits from IEA ratification, while brown industry owners anticipate that IEA membership will instead lead them (i.e. the owners) to experience a progression of IEA-regulation induced operating costs—ex-post to IEA membership. As a result of these anticipated payoffs, I speculated that during the negotiation process, brown industry owners will pressure autocrats to *not ratify* IEAs by threatening to spend capital to remove an autocrat—ex-post to an IEA's ratification—if an IEA is nevertheless ratified. When the latter threat proves credible, I accordingly theorized that autocrats generally have two options available to them: (i) an autocrat can choose to forsake IEA ratification, and the material benefits associated with it, in order to avoid these heightened levels of industry opposition or (ii) the autocrat can instead choose to ratify an IEA, while seeking to minimize

any subsequent increase in industry opposition by promising IEA cost-offsetting compensation to brown industry owners.

While anecdotal evidence suggests that such ex-post compensation may take various forms—including clandestine promises of IEA nonenforcement, assurances of direct financial assistance, or autocratic commitments to not interfere with international aid destined for afflicted domestic industries—I assume that industry owners will often be skeptical of these promises due to autocrats' general inabilities to make credible domestic commitments, especially in cases where autocratic leaders face weak constitutional constraints on their decision making powers. Using a one sided incomplete information signaling game, I therefore examine how these dynamics affect the actual timing of IEA ratification among authoritarian countries, given varying levels of brown industry dependence (as a share of GDP) and constitutional constraints. The unique separating equilibrium result from this signaling model offers several important insights into the behaviors of authoritarian countries vis-á-vis IEAs. First and foremost, the comparative statics from the signaling game described above suggest that immediate IEA ratification uniquely ties the hands of constitutionally unconstrained authoritarian leaders with high levels of brown industry dependence, credibly committing these autocrats to make good on their promises to provide compensation to brown industry owners ex-post to IEA ratification. As a result of this commitment mechanism, the model in turn suggests that—ex-post to IEA ratification—brown industry owners will reduce the actual amount of capital that they spend to oppose an authoritarian ruler in equilibrium. These dynamics accordingly compel unconstrained authoritarian leaders with high levels of brown industry dependence to ratify IEAs immediately, and furthermore enable this subset of autocratic rulers to *extend* their survival in office as a result.

By contrast, the signaling model (and anecdotal evidence) presented in Chapter 2 also demonstrates that constitutionally constrained autocracies should already possess a variety of institutional commitment mechanisms that allow them (i.e., the autocrats), albeit imperfectly, to make credible assurances of IEA compensation to domestic brown industry owners. As a direct result, my model suggests (i) that the presence of these less costly (domestic) commitment mechanisms will reduce constitutionally constrained authoritarian regimes' incentives to

use immediate IEA ratification as a means of tying their hands to follow through on their compensation-commitments, and accordingly, (ii) that higher industry dependence will be anticipated to raise the costs of (and time taken until) IEA ratification among these authoritarian regimes. Synthesizing this latter insight with those summarized earlier, the one sided incomplete information signaling model described above thereby offers three testable hypotheses. First, autocracies with low constitutional constraints are expected ratify IEAs more quickly than other authoritarian remiges, as their reliance on brown industry grows, because the signaling utility of such a ratification strategy will increase under these contexts (Hypothesis 1). Second, and relatedly, the constitutionally unconstrained autocracies with high industry dependence that do pursue this timely ratification strategy will survive longer in office as a result, since IEA membership in these cases will credibly commit an autocrat to providing industry owners with compensation ex-post to IEA ratification, thereby decreasing the amount of capital spent by these owners to remove the autocrat from office (Hypothesis 3). Finally, the opposite dynamics should hold true for constitutionally constrained autocrats, whom do not have the incentives to use immediate IEA ratification as a credible signal of their compensation commitments, and as a result, these regimes should accordingly become *less* likely to ratify an IEA immediately as brown industry dependence (and hence IEA opposition) increases (Hypothesis 2).

I test these three hypotheses over the course of two empirical chapters (Chapters 3 and 4). Chapter 3 applies a series of hazard models to a novel monthly data set of authoritarian countries' IEA ratification decisions[1] to empirically assess Hypotheses 1 and 2. With regards to Hypothesis 1, Chapter 3 demonstrates that constitutionally unconstrained authoritarian regimes with high levels of brown industry dependence are indeed more likely to (quickly) ratify IEAs than are unconstrained authoritarian regimes with low levels of industry dependence. Conversely, the survival analysis presented in Chapter 3 also confirms that, as posited by Hypothesis 2, brown industry dependence has the opposite effect in constitutionally constrained regimes: increased brown industry dependence leads to delayed ratification within these autocracies. Taken together, these results demonstrate that high levels of brown industry dependence exclusively lead

[1] Vis-à-vis the 15 most prominent (post-WWII) global IEAs.

constitutionally *unconstrained* autocracies to increase their demands for IEA-membership; which is consistent with the comparative static results presented in Chapter 2.

Chapter 4 directly tests my third and final hypothesis, which posits that—as a result of the hands tying dynamics described above—constitutionally unconstrained authoritarian regimes will be uniquely able to use IEA ratification (and IEA membership) to extend their survival in office *as their dependence on brown industries increases*. To evaluate this hypothesis, I construct a monthly data set of authoritarian regime failures, and examine the (constitutional constraints and brown industry dependence) contingent effects of IEA membership upon an autocrat's probability of regime failure through use of a bivariate probit model.[1] In line with Hypothesis 3, I find that *IEA Membership* increases constitutionally unconstrained autocrats' likelihoods of survival as brown industry increases, whereas this interactive effect does not hold for more constitutionally constrained authoritarian regimes. Moreover, by simultaneously accounting for the factors affecting whether (or not) an autocracy is member to a given IEA within this bivariate probit framework, Chapter 4 also allows for an auxiliary test of Hypotheses 1 and 2, and in doing so, confirms that the divergent effects of brown industry dependence (across unconstrained and constrained autocracies) that were identified for IEA ratification in Chapter 3 also hold for IEA membership more generally. Therefore, the empirical tests presented in Chapters 3 and 4 provide robust support for each of my three primary theoretical predictions.

5.2 Implications

My results offer a number of important contributions to our understandings of authoritarian regimes, environmental politics, and international institutions. First and foremost, the theoretical argument and empirical findings developed above help to explain the puzzling variation in authoritarian country IEA ratification

[1] As discussed above, this model allows me to account for the possibility that IEA membership is itself an endogenous covariate within this empirical setup by allowing for the determination of an autocracy's IEA (non-)membership to be correlated with that same autocracy's concurrent probability of regime failure.

behaviors that I presented in this dissertation's introduction. Specifically, it appears that *some* authoritarian regimes choose to ratify IEAs at a significantly faster speed than other autocratic ratifiers—and at a speed that is largely comparable to democratic ratifiers—because immediate IEA ratification enables this former set of autocracies to make credible promises to powerful domestic actors, and to thus prolong their survival in office. Given the global need for timely IEA participation by *some* authoritarian regimes—most notably China and Russia—these dynamics are intriguing. Indeed, and in line with recent research on the *design* of international institutions (e.g. 20, 30, 31, 32), these findings suggest that we may be able to elicit faster, and potentially more vigorous, IEA participation among *some* authoritarian countries by designing IEAs in a manner that better takes into account the domestic political institutions of these countries, as well as the bargaining dynamics that may arise between autocrats and influential industry owners.

Whether or not such an outcome would be ultimately beneficial to global society and the international environment, however, remains an open question. To this end, my findings indicate that the aforementioned (and potentially desirable) instances of near-immediate IEA participation by authoritarian regimes may also be associated with two generally accepted "bads". First, and as described in the theory chapter above, my formal model suggests that those autocracies that do ratify IEAs immediately will predominantly pursue this strategy in order to commit themselves to the provision of cost-offsetting compensation to brown industry owners. While anecdotal evidence suggests that this compensation may at times be comprised of direct financial transfers to greening industries (e.g., 193, 206, 210), I also argue above, and cite evidence to suggest, that these autocratic commitments will instead frequently take the form of clandestine autocratic assurances (to industry owners) of IEA nonenforcement (e.g., 203, 204, 205). Problematically, if the latter such promises comprise a majority of the commitments that autocrats make during their efforts to assure domestic brown industry owners of an IEA's negligible regulatory costs, then this would in turn guarantee that the those autocracies that happen to rapidly pursue IEA ratification (for these hands-tying purposes) will be subsequently committing themselves to *not enforce* the very environmental mandates that are bestowed upon them by an

IEA—thereby ensuring a highly detrimental outcome for the broader aims of international environmental cooperation. On the other hand, as mentioned above, if IEA membership instead *improves* environmental quality among authoritarian member countries—either by eliciting authoritarian leaders to provide financial transfers (in place of commitments to nonenforcement), or by socializing an autocracy into adopting more stringent domestic and international environmental policies down the road (55, 247, 294)—then the signaling dynamics identified above may ultimately have a net positive environmental payoff.

Second, the empirical analysis presented above also suggests that the hasty (authoritarian) IEA ratification behaviors that I identify here may also improve the prospects of regime survival for (some) autocratic ratifiers. As mentioned in Chapter 4, this finding accordingly implies that by striving to achieve (timely) global participation, IEAs will have the unintended consequence of prolonging (some) authoritarian leaders' actual survivals in office. Given the various ills associated with (prolonged) authoritarian rule,[1] for both environmental quality (73, 74, 75, 76, 77, 102) and basic human rights (53, 398, 399), the authoritarian IEA ratification behaviors examined above may therefore ultimately prove to be detrimental to aggregate levels of global environmental and societal wellbeing in the mid-to-long-term. Moreover, while this finding is striking, it is nevertheless consistent with recent academic research within other international treaty areas (e.g., 289, 810), and hence may be indicative of a broader pattern of autocrats' usage of international institutions as a means of prolonging the survival of their regimes. If true, then this result would directly call into question more general theoretical claims relating to the democratizing effects of international and regional organizations and institutions (400, 401, 402). Hence more research needs to be done on international institutions' (multiple potential) pathways of influence upon authoritarian survival (and democratization).

With regards to the academic study of authoritarian institutions more generally, my theory and findings directly suggest that international institutions will often serve as an auxiliary means for autocrats to make credible domestic commitments. Accordingly, this insight adds to a growing body of research on

[1] And especially within authoritarian countries that exhibit a complete absence of constitutional and institutional constraints.

authoritarian political institutions that has recently come to argue that, even absent free and fair elections, authoritarian governments will frequently be able to use political institutions—often in ingenious or unexpected ways—to make credible political commitments (165, 166, 167, 218, 220). Furthermore, in finding that it is *international* institutions that in this case enable autocrats to make these sorts of commitments, my analyses also suggest that even those autocrats that exhibit a scarcity of domestic institutional commitment mechanisms[1] will be able to make credible commitments to salient domestic (and potentially international) actors. By establishing this latter point, my research project thereby furthers our understanding of the potentially interactive effects of international and domestic political institutions,[2] and does so in a manner that unifies this line of research with a parallel area of scholarship that specifically examines the foreign policy decisions of authoritarian states (53, 168, 169).[3]

In this vein, there are several manners in which the formal and empirical analyses of authoritarian regime behaviors (presented above) might also serve as building blocks for future research on comparative authoritarian politics. For instance, the monthly codings of authoritarian regime end-dates that I develop in Table 4.3,[4] I believe, will greatly help to further the study of both (i) authoritarian politics and (ii) the political-economic determinants of authoritarian regime failures. Indeed, as argued in the Data Appendix to Chapter 4, my monthly (primary and alternate) codings of authoritarian regime end-dates will be especially useful to scholars interested in determining precisely how and when *political-economic events* affect authoritarian collapses and related regime transitions, as these sorts of analyses rely on the precise temporal coding of such authoritarian end events. Similarly, in crafting a formal theory that treats authoritarian countries' foreign policy decisions as a bargaining outcome between autocrats and industry owners, it is hoped that the signaling model employed in this dissertation will serve as a theoretical template for the future analysis of similar (industry influenced)

[1] And that extant research generally assumes will be unable to make credible promises (165, 166, 167, 220).

[2] An important contemporary area of international relations research (17, 30, 31).

[3] For additional examples of recent research that exhibits a similar unifying approach across these two research agendas, see (162, 171).

[4] Which draw heavily upon the authoritarian regime book developed by Geddes, Wright, Frantz (184) to code.

authoritarian foreign policy decisions, such as those relating to International Monetary Fund (IMF) program participation, Regional Trade Agreement (RTA) and bilateral investment treaty (BIT) membership, regional integration and currency unions, and international loan repayments.

Lastly, and depending on the degree to which IEA membership actually produces substantive improvements in (domestic and international) environmental quality, my findings may also have a number of important implications for our conceptions of 'environmental politics' in authoritarian remiges, and of the broader consequences of these politics for (i) global environmental cooperation, (ii) the global race to the bottom in environmental standards and (iii) related phenomena such as trade leakages and pollution havens. In these regards, it could be argued that explaining why, and when, authoritarian countries ratify IEAs gives researchers and policymakers a better understanding of the environmental preferences of authoritarian governments more generally;[1] which comprise a subset of political regimes that—due to their restrictions on elections and individual freedoms—lack straightforward channels of domestic pro-environmental pressure. As elucidated above, such an understanding is critical to the environmental quality of the world as a whole. For example, the minimum participation requirements and 'entry into force' clauses that are incorporated into many prominent global IEAs have ensured that the *timing* of IEA ratifications is itself instrumental component to an IEA's success. This feature has proven to be particularly salient among authoritarian IEA ratification speeds, wherein the Kyoto Protocol's entrance into force was ultimately (and singularly) dependent on its ratification by authoritarian Russia (150, 151),[2] while China's ratification of the Montreal Protocol is often characterized as being equally critical to the achievement of developing country participation in (and hence overall success of) this latter Protocol (153, 71). Hence, a better understanding of the domestic determinants of environmental politics of authoritarian regimes may improve the *global* speed and depth of IEA participation.

[1] And the sources of these preferences.

[2] And moreover, as one policy outlet noted "the U.S. government used the absence of key developing countries as an excuse to justify its withdrawal from the Kyoto Protocol" (152).

These pivotal contributions of China and Russia to the past successes of the Montreal and Kyoto Protocols drive home a related point. Above and beyond the necessity of full (authoritarian country) participation to the achievement of (timely) global environmental cooperation, the consummation of many prominent areas of environmental cooperation—including those related to climate change—is becoming increasingly beholden to the timely IEA-participation of several key authoritarian countries. Indeed, as one scholarly account recently stated, "on a very practical level, China is absolutely central to the world's efforts to address climate change" (154, xi). Hence, in bringing us one step closer to explaining why environmental cooperation's most prominent authoritarian gate-keepers, including China, Russia, and the Group of 77 (G77) bargaining bloc,[1] have agreed to join and participate in IEAs (or not), this dissertation has furthered our abilities to understand and improve future international environmental cooperation in areas such as climate change, deforestation, and biodiversity conservation.

Moreover, a core implication of the "global commons" nature of international environmental problems (141) is that IEAs must achieve full (global or regional) participation in order to effectively solve the global (or regional) environmental issues that they seek to address (40, 574). Without such participation, concerns over free-riding, trade leakage, and the shifting of dirty industries to "pollution havens" in nonparticipating (authoritarian) countries will often preclude successful global environmental cooperation among even the most environmentally motivated states (100, 142, 143, 144, 145, 397-398). As argued above, the positive relationship between brown industry dependence and IEA-membership in unconstrained autocracies (identified above) challenges our conventional understandings of the pollution haven and race to the bottom hypotheses, which argue, in part, that declining trade barriers should enable pollution-intensive industries to relocate to countries with less stringent environmental regulation—thereby given heavily industry dependent states a disincentive for stringent environmental reg-

[1] A group of developing countries whose membership includes nearly all authoritarian countries of the world (a major exception being the Soviet and post Soviet states of Eastern Europe and Central Asia). Notably, and depending on the year, authoritarian countries encompass a majority of all G77 member countries—as based upon the binary autocracy-democracy classification scheme developed by (7).

ulation (283). My primary results,[1] however, suggest that for some authoritarian regimes, *more* (international) environmental regulation will at times induce *more* domestic industry satisfaction—which is the exact opposite of what the pollution haven and race to the bottom theories would expect. Thus, and in contrast to the expectations of the pollution haven hypothesis, environmental regulation may at times help (authoritarian) governments to conciliate domestic brown industries, rather than compelling such industries to abscond, thereby ensuring that in some instances, higher levels of brown industry dependence may actually lead to *more stringent* (de jure) environmental regulation.[2]

5.3 Future Extensions

As mentioned above, several of the most interesting implications of this dissertation—including those related to the race to the bottom thesis, to IEA compliance, and to the abilities of global IEAs to successfully address transnational environmental problems—largely hinge on whether the above behaviors influence domestic and transnational *environmental* outcomes. Accordingly, in the next iteration of this research project, I plan to extend my formal model to examine the implications of my findings for authoritarian countries' actual levels of (i) domestic environmental performance and (ii) IEA compliance, both for constitutionally unconstrained autocracies and for more constitutionally constrained authoritarian regimes. After formally deriving this set of additional testable propositions relating to environmental quality and IEA compliance, I then hope to use the monthly IEA membership data described above, along with a variety of country-level environmental performance indicators,[3] to assess whether there exists sizable variation in the effect(s) of IEA membership on domestic levels of pollution-reduction among authoritarian regimes faced with varying levels of brown industry dependence and

[1] In particular, the identified positive relationship between IEA membership/ratification and brown industry dependence among unconstrained autocracies.

[2] Indeed, IEA membership levels correlate very highly with domestic environmental regulation, and the former is often used as a proxy for the latter (284, 285, 72).

[3] Such as country-year data on the air and water pollution (as defined by reported levels of SO_2, CO_2, and Biological Oxygen Demand) and various measures of the environmental impact of countries (e.g., 403, 404).

constitutional constraints. No matter the direction or level of significance of these findings, I believe that such results will offer valuable insights into the nature of the environmental tradeoffs that may arise between (i) the potential inclusion of authoritarian governments within IEAs (and the adverse consequences this may have for authoritarian survival) and (ii) the potential exclusion of autocracies from global IEAs altogether (and the adverse consequences that this may have for environmental cooperation, leakage, and pollution havens).

A second and related planned extension of the current dissertation project relates to the future development of the signaling model presented above so as to the fully accommodate *dynamic* IEA ratification decisions, and to potentially incorporate a third (international) actor—such as the IEA itself—into the negotiation process. At present, the formal model that I develop above—while capturing much of the event sequencing that occurs during an autocracy's IEA ratification decision—is not fully dynamic in that it currently treats IEA ratification as a single immediate decision that autocracies must make (or not make). Yet, IEA (non)ratification decisions are often revisited, over time, in a repeated fashion by potential ratifiers, and are often weighed within the context of their anticipated decisions vis-á-vis other IEAs available for ratification (or under negotiation).

Ergo, it is likely that in practice, an (unconstrained, highly industry dependent) autocrat's commitment to cost-offsetting compensation is learned slowly by industry owners, over the course of many domestic political cycles and multiple (speedy) IEA ratifications, as an autocrat seeks to build its reputation as a credible provider of cost-offsetting compensation. Hence, formally modeling the repeated, and interrelated nature of IEA ratifications, in addition to being more true to real world ratification practices, may reveal additional insights into the interplay between authoritarian commitments, industry owners' threats of opposition spending, and IEA ratification strategies.[1] Similarly, the uneven nature of the future (internationally-arising) costs and benefits to be had from IEA membership[2] are not fully incorporated into the present signaling model, as these costs and benefits are often distributed by a third independent actor: the IEA itself

[1]Examples of dynamic signaling models to draw upon for this extension include (405, 406, 407).

[2]I.e., for an autocratic ratifier.

(or, in some cases, a small set of powerful member countries). Thus, fully incorporating the IEA itself as a third actor within future iterations of my signaling model would allow me to better account for the nonconstant nature of IEA-to-autocracy allocations of membership benefits and noncompliance punishments, as well as the potentially strategic nature of these transfers.

A third anticipated extension of the present dissertation relates to the potential use of country-level case studies—or auxiliary empirical analyses—to improve the credibility of my tests of Hypotheses 1-3. While the empirical tests and variable operationalizations that I utilize and discuss above allow me to assess my hypotheses across a wide range of authoritarian countries and IEAs, their construct validity is undermined by two interrelated limitations. First, not all brown industries are comparable, and in contrast to the present operationlization of *Brown Industry* dependence, authoritarian countries often vary extensively in their brown industry composition,[1] even in cases where they (i.e., autocracies) exhibit comparable levels of aggregate brown industry dependence (as a share of GDP). Similarly, and as indicated by Table 3.1, the 15 major global IEAs examined in detail above do not uniformly regulate *all* brown industries equally. Rather, each of the 15 IEAs that I include in Chapter 3 and 4's empirical analyses individually regulate a unique, and often disparate, subset of brown industry-sectors. As a result, my autocracy-IEA pooled analyses likely introduce a notable degree of measurement error (and irrelevant comparisons) into my attempts to empirically assess the influences of industry dependence on the authoritarian outcomes examined above. For example, one should not expect based on the theory above that Zambia's high levels of copper-sector dependence would compel its (historically constitutionally unconstrained) government to rapidly pursue all 15 of the IEAs included in Table 3.1 for signaling purposes, as several of these 15 IEAs do not explicitly regulate *any* domestic environmental practices affecting the extraction and refinement of copper ore. The same could be said of Saudi Arabia and its dependence on the petroleum industry.

Therefore, a more nuanced set of tests for Hypotheses 1-3 would better 'match up' major global IEAs (and the industries that they explicitly regulate) to the heterogeneous compositions of brown industry dependence across my sample of

[1] Both across countries and over time.

authoritarian countries. One way to do so would be to use case studies to examine a small set of (constitutionally unconstrained and constrained) authoritarian countries, over time, in efforts to assess whether their ratification decisions vis-á-vis those IEAs that specifically seek to regulate each country's actual domestic industries serve to confirm or refute my theoretical predictions. If these country-cases where chosen wisely, such an approach would also allow me to examine how these dynamics play out over time, for as was indicated in Chapter 3, many authoritarian countries exhibit temporal variation in their levels of constitutional constraints, as well as in their composition of industry dependence, as industrialization progresses and different development policies are pursued. Conversely, a second solution to these measurement problems would be to collect and code better data on brown industry regulation for each specific IEA,[1] as well as more disaggregated data on authoritarian countries' specific sub-sectors of brown industry dependence,[2] and use these measures within pooled empirical analyses similar to those presented in Chapters 3 and 4. Indeed, my current autocracy-IEA unit of observation would allow me to easily include such measures within the empirical models employed above, and hence the addition of these more fine grained measurements of *Brown Industry* would—like the case studies discussed above—greatly improve the accuracy of my primary hypotheses tests.

Finally, while Chapter 4 provides for a robust test of the conditional effects of IEA membership on an authoritarian regime's ultimate survival, it does not provide for a comprehensive assessment of *all* of the causal steps that belie this outcome. In fact, the signaling model presented in Chapter 2 suggests that a highly industry dependent, constitutionally unconstrained autocrat's decision to immediately ratify an IEA will produce several intermediate outcomes—ex-post to IEA ratification—that are then in turn assumed influence an authoritarian regime's ultimate failure; namely, (i) the actual transfer of IEA cost-offsetting

[1]That is, to code each IEA in accordance to the major brown industries that that IEA seeks to regulate, perhaps by identifying the industries mentioned within the texts of each IEA's respective treaty documents through a probabilistic topic modeling approach (e.g., 408, 409).

[2]One potential "first-cut" at doing so would be to use the UN's Commodity Trade Statistics Database (410) to identify and code the primary brown industry export sectors of a given country (under the assumption that these exports serve as a good proxy for total domestic brown industry production).

compensation from an autocrat to industry owners and (ii) a subsequent observed decrease in the level of industry owner's spending to oppose the autocrat.

Hence, two interesting empirical tests of these intermediate propositions would be as follows. First, it would be interesting to assess whether we actually observe the former transfers (of cost-offsetting compensation) from unconstrained autocrats with high industry dependence to brown industry owners, and whether these commitments to compensation disproportionately manifest themselves in lower levels of IEA compliance (assuming that these commitments predominantly take the form of clandestine commitments to nonenforcement). While an empirical test of this phenomenon would be difficult to institute, given that these commitments are clandestine, my searches for anecdotal evidence of this sort suggest that instances of authoritarian country non-compliance with IEAs are often reported upon within news media outlets and actual treaty documents. Thus a systematic machine coding of these reports would provide an useful, albeit likely non-random, data set for testing this intermediate causal step.

Second, as mentioned above, it would also be interesting to examine whether IEA ratification[1] uniquely compels brown industry actors to reduce *their* levels of government opposition. I believe that such a test would be feasible if one were to look at whether these instances of IEA ratification actually led to reductions in the number of monthly domestic verbal (and perhaps material) conflict events arising from industry, business, and opposition actor-sources and targeting government actors. Indeed, if IEA membership is expected to decrease the amount of capital spent by industry owners to oppose a government in these situations, then we should expect to see declines in the actual number of threats initiated by industry and opposition party actors[2] against a country's authoritarian government. Moreover, it is likely that the newly released Global Data on Events, Location and Tone (GDELT) event data set (411) would allow for a direct test of this very preposition for much of the sample frame examined above.

[1] By constitutionally unconstrained authoritarian regimes with high industry dependence.

[2] I assume above that industry owners will often fund opposition parties in attempting to depose of an autocrat, and hence the additional assumption that I am making here is that given increased funding, these opposition actors will increase their actual initiations of verbal (and material) conflict against the government.

References

[1] Frank Mcdonald. **Environmental case holds its ground against trade lobby: Ethiopia's heroic stand against the OPEC lobby effectively prevented a 'sell-out'**. The Irish Times, 2002/09/03. 1

[2] Birmingham Post. **Trade Deal Threatens Unity**. Birmingham Post, 2002/08/31. 1

[3] Africa News. **South Africa; Summit Negotiators Still Arguing on Trade and Finance**. Africa News, 2002/09/01. 1

[4] Michael Hanlon. **Summit heads for meltdown**. Daily Mail (London), 2002/09/02. 1

[5] Amanda Hodge. **Leaders given summit deadline: three days to save the world**. The Australian, 2002/09/02. 1

[6] Frank Mcdonald. **An 'unholy alliance' blocking progress - Robinson**. The Irish Times, 2002/09/03. 1, 11

[7] Jose Antonio Cheibub, Jennifer Gandhi, and James Raymond Vreeland. **Democracy and Dictatorship Revisited**. *Public Choice*, **143**(1-2):67–101, 2010. 2, 13, 20, 63, 90, 126, 127, 128, 134, 135, 142, 143, 154

[8] Freedom House. **Freedom in the World**. Freedom House, 2010. http://www.freedomhouse.org. 2

[9] David Louis Cingranelli and David L. Richards. **The Cingranelli-Richards (CIRI) Human Rights Dataset**. Version 2010.05.17. http://www.humanrightsdata.org., 2010. 2

[10] Berhe W. Aregay. **Ethiopia; Pollution From Construction Sites**. The Monitor - Addis Ababa, 1998/07/28. 2

[11] The Nation. **Environment; Tonnes of Toxic Waste Dumped in Africa**. Africa News, 2001/06/14. 2, 9

[12] Xinhua. **Over 900 Contaminated Sites Observed in Ethiopia**. Xinhua General News Service, 2002/04/23. 2

[13] Rose Mwebaza, Philip Njuguna Mwanika, and Wondowossen Sintayehu Wonndemagegnehu. **Situation Report: Environmental Crimes in Ethiopia**. Institute for Security Studies (iSS), 2009. 2

[14] Bureau of Democracy, Human Rights, and Labor. **Ethiopia: Country Reports on Human Rights Practices**. U.S. Department of State, 2001. http://www.state.gov/j/drl/rls/hrrpt/2001/af/8372.htm. 2

[15] European Union. **Ethiopia Legislative Elections 2005 Final Report**. European Union Election Observer Mission, Brussels, 2005. 2

[16] Robert Axelrod and Robert O. Keohane. **Achieving Cooperation under Anarchy: Strategies and Institutions**. *World Politics*, **38**(1):226–254, 1985. 3

[17] Lisa L. Martin and Beth A. Simmons. **Theories and Empirical Studies of International Institutions**. *International Organization*, **52**(4):729–757, 1998. 3, 26, 83, 152

[18] Giovanni Maggi. **The Role of Multilateral Institutions in International Trade Cooperation**. *The American Economic Review*, **89**(1):190–214, 1999. 3

[19] Jeffrey Kucika and Eric Reinhardt. **Does Flexibility Promote Cooperation? An Application to the Global Trade Regime**. *International Organization*, **62**(03):477–505, 2008. 3

[20] Barbara Koremenos, Charles Lipson, and Duncan Snidal. **The Rational Design of International Institutions**. *International Organization*, **55**(4):761–799, 2001. 3, 20, 150

[21] James D. Morrow. **When Do States Follow the Laws of War?** *American Political Science Review*, **101**(3):559–572, 2007. 3

[22] Peter M. Haas. **Do Regimes Matter? Epistemic Communities and Mediterranean Pollution Control**. *International Organization*, **43**(3):377–403, 1989. 3, 10

[23] John J. Mearsheimer. **The False Promise of International Institutions**. *International Security*, **19**(3):5–49, 1994. 3, 118

[24] John J. Mearsheimer. **A Realist Reply**. *International Security*, **20**(1):82–93, 1995. 3

[25] Robert O. Keohane and Lisa L. Martin. **The Promise of Institutionalist Theory**. *International Security*, **20**(1):39–51, 1995. 3

[26] George W. Downs, David M. Rocke, and Peter N. Barsoom. **Is the Good News about Compliance Good News About Cooperation?** *International Organization*, **50**(3):379–406, 1996. 3, 118

[27] Beth Simmons. **Compliance with International Agreements**. *Annual Review of Political Science*, **1**:76–93, 1998. 3

[28] Beth A. Simmons and Daniel J. Hopkins. **The Constraining Power of International Treaties: Theory and Methods**. *American Political Science Review*, **99**(4):623–631, 2005. 3

[29] Beth Simmons. **Treaty Compliance and Violation**. *Annual Review of Political Science*, **13**:273–296, 2010. 3, 20

[30] B. Peter Rosendorff and Helen Milner. **The Optimal Design of International Trade Institutions: Uncertainty and Escape**. *International Organization*, **55**(4):829–857, 2001. 3, 26, 83, 150, 152

[31] B. Peter Rosendorff. **Stability and Rigidity: Politics and Design of the WTO's Dispute Settlement Procedure**. *American Political Science Review*, **99**(3):389–400, 2005. 3, 150, 152

[32] Barbara Koremenos. **Contracting Around International Uncertainty**. *American Political Science Review*, **99**(4):549–565, 2005. 3, 20, 150

[33] Beth A. Simmons. **International Law and State Behavior: Commitment and Compliance in International Monetary Affairs**. *American Political Science Review*, **94**(4):819–835, 2000. 3, 4, 66

[34] J. Lawrence Broz and Jeffry A. Frieden. **The Political Economy of International Monetary Relations**. *Annual Review of Political Science*, **4**:317–343, 2001. 3

[35] Darren Hawkins. **Explaining Costly International Institutions: Persuasion and Enforceable Human Rights Norms**. *International Studies Quarterly*, **48**(4):779–804, 2004. 3

[36] Beth A. Simmons. *Mobilizing for Human Rights: International Law in Domestic Politics*. Cambridge University Press, 2009. 3

[37] Alan E. Boyle. **Saving the World - Implementation and Enforcement of International Environmental Law through International Institutions**. *Journal of Environmental Law*, **3**:229–245, 1991. 3

[38] Rondald B. Mitchell. *Intentional Oil Pollution at Sea: Environmental Policy and Treaty Compliance*. MIT Press, Cambridge, MA, 1994. 3

[39] Carlo Carraro and Domenico Siniscalco. **International Institutions and Environmental Policy: International Environmental Agreements: Incentives and Political Economy**. *Euorpean Economic Review*, **42**(3-5):561572, 1998. 3, 20

[40] Giulio Ecchia and Marco Mariotti. **Coalition Formation in International Environmental Agreements and the Role of Institutions**. *European Economic Review*, **42**(3-5):573–582, 1998. 3, 19, 119, 154

[41] Steven Bernstein. **International Institutions and the Framing of Domestic Policies: The Kyoto Protocol and Canada's Response to Climate Change**. *Policy Studies*, **35**(2):203–236, 2002. 3

[42] Barbara Koremenos. **Loosening the Ties that Bind: A Learning Model of Agreement Flexibility**. *International Organization*, **55**(2):289–325, 2001. 3

[43] M. J. Peterson. **The Use of Analogies in Developing Outer Space Law**. *International Organization*, **51**(2):245–274, 1997. 3

[44] Michael J. Gilligan and Leslie Johns. **Formal Models of International Institutions**. *Annual Review of Political Science*, **15**:221–343, 2012. 3

[45] Robert D. Putnam. **Diplomacy and Domestic Politics: the Logic of Two-level Games**. *International Organization*, **42**(3):427–460, 1998. 3

[46] Helen V. Milner and B. Peter Rosendorff. **Democratic Politics and International Trade Negotiations: Elections and Divided Government As Constraints on Trade Liberalization**. *Journal of Conflict Resolution*, **41**(1):117–146, 1997. 3

[47] Eric Neumayer. **Death Penalty Abolition and Ratification of the Second Optional Protocol**. *International Journal of Human Rights*, **12**(1):3–21, 2008. 3, 4, 66, 101

[48] Jana von Stein. **The International Law and Politics of Climate Change: Ratification of the United Nations Framework Convention and the Kyoto Protocol**. *Journal of Conflict Resolution*, **52**(2):243–268, 2008. 4, 6, 10, 14, 18, 19, 21, 64, 66, 71, 73, 81, 93, 101

[49] Janet Box-Steffensmeier, Peter Radliffe, and Brandom Bartels. **The Incidence and Timing of PAC Contributions to Incumbent U.S. House Members, 1993-94**. *Legislative Studies Quarterly*, **30**(4):549–579, 2005. 4

[50] Yoram Z. Haftel and Alexander Thompson. **Ratification Matters: The Domestic Fate of Bilateral Investment Treaties**. Paper Presented at the APSA 2009 Toronto Meetings, 2009. 4, 38

[51] Wade M. Cole. **Sovereignty Relinquished? Explaining Commitment to the International Human Rights Covenants, 1966-1999**. *American Sociological Review*, **70**(3):472–495, 2005. 4, 5

[52] Oona A. Hathaway. **Why do Countries Commit to Human Rights Treaties?** *Journal of Conflict Resolution*, **51**(4):588–621, 2007. 4, 5

[53] James Raymond Vreeland. **Political Institutions and Human Rights: Why Dictatorships Enter into the United Nations Convention Against Torture**. *International Organization*, **62**(1):65–101, 2008. 4, 21, 26, 83, 151, 152

[54] Douglas M. Gibler and Scott Wolford. **Private Investment and the Institutionalization of Collective Action in Autocracies: Ruling Parties and Legislatures**. *Journal of Conflict Resolution*, **50**(1):129, 2006. 4

[55] David John Frank. **The Social Bases of Environmental Treaty Ratification, 1900-1990**. *Sociological Inquiry*, **69**:523–550, 1999. 4, 95, 151

[56] Miaojie Yu and Ka-Fu Wong. **Democracy and the GATT/WTO Accession Duration**. Available at SSRN: `http://ssrn.com/abstract=982032orhttp://dx.doi.org/10.2139/ssrn.982032`, 2008. 4, 5

[57] Mark S. Copelovitch and David Ohls. **Trade, Institutions, and the Timing of GATT/WTO Accession in Post-Colonial States**. *Review of International Organizations*, **7**:81–107, 2012. 4, 5

[58] Edward D. Mansfield, Helen V. Milner, and B. Peter Rosendorff. **Why Democracies Cooperate More: Electoral Control and International Trade Agreements**. *International Organization*, **56**(3):477–513, 2002. 4, 18

[59] Edward D. Mansfield, Helen V. Milner, and Jon C. Pevehouse. **Vetoing Cooperation: The Impact of Veto Players on Preferential Trading Arrangements**. *British Journal of Political Science*, **37**(3):403–432, 2007. 4, 5

[60] Christopher s. Magee. **Endogenous Preferential Trade Agreements: An Empirical Analysis**. *Contributions to Economic Analysis & Policy*, **2**(1):1–17, 2003. 4

[61] Edward D. Mansfield, Helen V. Milner, and Jon C. Pevehouse. **Democracy, Veto Players and the Depth of Regional Integration**. *The World Economy*, **31**(1):67–96, 2008. 5

[62] Andrew Moravcsik. **The Origins of Human Rights Regimes: Democratic Delegation in Postwar Europe**. *International Organization*, **54**(2):217–252, 2000. 5, 119

[63] Oona A. Hathaway. **The Cost of Commitment**. *Stanford Law Review*, **55**:1821–1862, 2003. 5, 6

[64] Todd Landman. *Protecting Human Rights: A Comparative Study*. Georgetown University Press, Washington, D.C., 2005. 5

[65] Jay Goodliffe, Darren Hawkins, Christine Horne, and Daniel L. Nielson. **Dependence Networks and the International Criminal Court**. *International Studies Quarterly*, **56**(1):131–147, 2012. 5, 66, 67, 81

[66] Oona A. Hathaway. **Do Human Rights Treaties Make a Difference?** *The Yale Law Journal*, **111**(8):1935–2042, 2002. 6

[67] James Raymond Vreeland. **CAT Selection: Why Governments Enter into the U.N. Convention Against Torture**. Working Paper, 2009. 6

[68] Jay Goodliffe and Darren Hawkins. **Explaining Commitment: States and the Convention against Torture**. *Journal of Politics*, **68**(2):358–371, 2010. 6

[69] Per G. Fredriksson and Noel Gaston. **Ratification of the 1992 Climate Change Convention: What Determines Legislative Delay**. *Public Choice*, **104**:345–368, 2000. 6, 10, 14, 18, 21, 66, 71

[70] Eric Neumayer. **Does Trade Openness Promote Multilateral Environmental Cooperation?** *World Economy*, **25**(6):815–832, 2002. 6, 10, 64, 100, 101

[71] M.C. McGuire and M. Olson. **The economics of autocracy and majority rule: the invisible hand and the use of force**. *Journal of Economic Literature*, **34**(1):72–96, 1996. 6

[72] Roger A. Payne. **Freedom and the Environment**. *Journal of Democracy*, **6**:41–55, 1995. 6, 9

[73] P.G. Fredriksson, E. Neumayer, R. Damania, and S. Gates. **Environmentalism, Democracy, and Pollution Control**. *Journal of Environmental Economics and Management*, **49**(2):343–365, 2005. 6, 119, 151

[74] Mariano Torras and James K. Boyce. **Income, Inequality, and Pollution: A Reassessment of the Environmental Kusznets Curve**. *Ecological Economics*, **25**(2):147–160, 1998. 7, 151

[75] Scott Barrett. **Freedom, Growth, and the Environment**. *Environment and Development Economics*, **5**(4):433–456, 2000. 7, 151

[76] Y. Hossein Farzin and Craig A. Bond. **Democracy and Environmental Quality**. *Journal of Development Economics*, **81**(1):213–235, 2005. 7, 151

[77] Quan Li and Rafael Reuveny. **Democracy and Environmental Degradation**. *International Studies Quarterly*, **50**:935–956, 2006. 7, 119, 151

[78] Lyle A. Scruggs. **Political and Economic Inequality and the Environment**. *Ecological Economics*, **26**(3):259–275, 1998. 7

[79] Lorenzo Pelligrini and Reyer Gerlagh. **Corruption, Democracy, and Environmental Policy: An Empirical Contribution to the Debate**. *The Journal of Environment & Development*, **15**(3):332–354, 2006. 7

[80] Per G. Fredriksson and Jim R. Wollscheid. **Democratic Institutions Versus Autocratic Regimes: The Case of Environmental Policy**. *Public Choice*, **130**:381–393, 2007. 7

[81] L.A. Times. **World IN BRIEF : SOVIET UNION : Lawmaker Reports Nuclear Dumping**. Los Angeles Times, 1991/09/25. http://articles.latimes.com/1991-09-25/news/mn-2534_1_soviet-union. 7

[82] The Globe and Mail. **Dnieper Pollution Ills Disclosed by Soviets**. The Globe and Mail (Canada), 1984/02/09. 7

[83] The Globe and Mail. **The Soviet Union's dirty secrets**. The Globe and Mail (Canada), 1992/11/10. 7

[84] Craig R. Whitney. **Soviet Pollution Hurts Finnish Wilderness**. New York Times, 1989/05/23. 7

[85] D'vora Ben Shaul. **Russian Official: CIS Environment a 'Disaster Zone'**. The Jerusalem Post, 1993/01/18. 7

[86] Courier-Mail. **Old Soviet Union in Dreadful State**. Courier-Mail, 1993/02/06. 7

[87] Blacksmith. **The World's Worst Polluted Places**. The Blacksmith Institute, 2007. http://www.blacksmithinstitute.org/the-2007-top-ten-of-worst-polluted-places.html. 7

[88] Leading Edge. **Soviet Union's Polluted Land**. *The Lancet Oncology*, **8**:953, 2007. 7

[89] Soderlind. **Polish Pollution: Literally a Matter of Survival**. U.P.I. (Nexis, Omni File), 1986/02/09. 8

[90] Soderlind. **Foreign News Briefs**. U.P.I. (Nexis, Omni File), 1986/02/09. 8

[91] D.H. Cole. **Cleaning up Krakow: Poland's Ecological Crisis and the Political Economy of International Environmental Assistance**. *Colo. J. Int'l Envtl. L. & Pol'y*, **2**:205–246, 1991. 8

[92] Richard A. Liroff. **Eastern Euorpe: Restoring a Damaged Environment**. In EPA Journal, editor, *The World Economy and the Environment: A New Relationship*. United States Environmental Protection Agency, Washington, D.C., 1994. 8

[93] Elizabeth C. Economy. *The River Runs Black: The Environmental Challenge To China's Future*. Cornell University Press, Ithaca, NY, 2005. 8

[94] Judith Shapiro. *Mao's War Against Nature: Politics and the Environment in Revolutionary China*. Cambridge University Press, Cambridge, UK, 2001. 8

[95] Judith Shapiro. *China's Environmental Challenges*. Polity Press, Cambridge, UK, 2012. 8

[96] Allison Jackson. **China Slips into Disaster - Environmental Cost of Rampant Growth**. The Daily Telegraph (Australia), 2010/08/14. 8

[97] Wang Xiangwei. **Clean Air to Breathe is a Human Right, Too; As Anger Grows Among Smogbound Residents, the Leadership Seems to Lack the Political Will to Make Tackling Rampant Pollution a Top Priority**. South China Morning Post, 2013/02/04. 8

[98] The Herald. **Zimbabwe; UN Warns of Global Dangers Posed By Heavy Metal**. Africa News, 2004/02/10. 9

[99] James C. Murdoch and Todd Sandler. **The Voluntary Provision of a Pure Public Good: The Case of Reduced CFC Emissions and the Montreal Protocol**. *Journal of Public Economics*, **63**(3):331–349, 1997. 9

[100] Ulrich J. Wagner. **The Design of Stable International Environmental Agreements: Economic Theory and Political Economy**. *Journal of Economic Surveys*, **15**(3):377–411, 2001. 9, 19, 20, 29, 37, 38, 44, 154

[101] Tseming Yang. **International Treaty Enforcement as a Public Good: Institutional Deterrent Sanctions in International Environmental Agreements**. bepress Legal Series Paper 1136, 2008. 9

[102] R. D. Congleton. **Political Institutions and Pollution Control**. *Review of Economics and Statistics*, **74**:412–421, 1992. 9, 71, 151

[103] Bruce P. Chadwick. **Fisheries, Sovereignties and Red Herrings**. *Journal of International Affairs*, **48**(2):559–584, 1995. 9

[104] Eric Neumayer. **Do Democracies Exhibit Stronger International Environmental Commitment? A Cross Country Analysis**. *Journal of Peace Research*, **39**(2):139–164, 2002. 9, 10, 14, 18, 21, 100

[105] J. Timmons Roberts, Bradley C. Parks, and Alexis A. Vásquez. **Who Ratifies Environmental Treaties and Why? Institutionalism, Structuralism and Participation by 192 Nations in 22 Treaties**. *Global Environmental Politics*, **4**(3):22–64, 2004. 10, 18, 64

[106] P. Bernhagen. **Business and International Environmental Agreements: Domestic Sources of Participation and Compliance by Advanced Industrial Democracies**. *Global Environmental Politics*, **8**:78–110, 2008. 10, 18, 47

[107] Xinyuan Dai. **Why Comply? The Domestic Constituency Mechanism**. *International Organization*, **59**(2):363–398, 2005. 10, 18, 47

[108] Per G. Fredriksson and Noel Gaston. **The Importance of Trade for the Ratification of the 1992 Climate Change Convention**. In Per G. Fredriksson, editor, *Trade, Global Policy, and the Environment*. World Bank, Washington D.C., 2000. 10, 14, 18, 21

[109] Thomas Bernauer, Anna Kalbhenn, Vally Koubi, and Gabriele Spilker. **A Comparison of International and Domestic Sources of Global Governance Dynamics**. *British Journal of Political Science*, **40**(3):509–538, 2010. 10, 14, 18, 21

[110] Thomas Bernauer, Tobias B́ohmelt, and Vally Koubi. **Is There a DemocracyCivil Society Paradox in Global Environmental Governance?** *Global Environmental Politics*, **13**(1):88–107, 2013. 10, 14, 18, 21

[111] Monty G. Marshall, Keith Jaggers, and Ted Robert Gurr. **Polity IV Project: Political Regime Characteristics and Transitions, 1800-2010**. Center for Systemic Peace, 2010. 10, 24, 37, 67, 71, 95, 126

[112] Per G. Fredriksson and Gergely Ujhelyi. **Political Instatutions, Interest groups, and the Ratification of International Environmental Agreements**. Unpublished Manuscript, 2006. 10

[113] Per G. Fredriksson, Eric Neumayer, and Gergely Ujhelyi. **Environmentalism, Democracy, and Pollution Control**. *Public Choice*, **133**(1-2):231–251, 2007. 10

[114] Sammy Zahran, Eunyi Kim, Xi Chen, and Mark Lubell. **Ecological Development and Global Climate Change: A Cross-National Study of Kyoto Protocol Ratification**. *Society & Natural Resources: An International Journal*, **20**(1):37–55, 2007. 10

[115] Alexandre Sauquet. **Exploring the Nature of Intercountry Interactions in the Process of Ratifying International Environmental Agreements: the Case of the Kyoto Protocol**. *Public Choice*, pages 1–18, 2012. 10, 14, 18, 21

[116] EPA. *Mexico's Strategy on Ozone Layer Protection: A Case Study on the Costs of Implementing the Montreal Protocol*. Secretaria De Desarollo Urbano y Ecologia, Camara Nacional de al Industria de la Transformacion, and U.S. Environmental Protection Agency, Washington, D.C., 1990. 11

[117] WWF. **CITES**. World Wildlife Fund, 2013. http://worldwildlife.org/pages/cites. 11

[118] Rochelle Spencer. *Development Tourism: Lessons from Cuba*. Ashgate Publishing Limited, Burlington, VT, 2010. 11

[119] Richard Black. **Crime Rings Boost Ivory Smuggling**. BBC News website, 2009/11/11. http://news.bbc.co.uk/2/hi/science/nature/8355527.stm. 11

[120] James Brooke. **Siberian Tiger Hunt Seeks To Save, Not Shoot, the Big Cats**. The New York Times, 2005/01/16. 11

[121] Brettina Wassener. **Taking Shark Fin Soup Off the Menu**. The New York Times Blogs, 2012/07/03. 12

[122] Waniss Otman and Erling Karlberg. *The Libyan Economy: Economic Diversification and International Repositioning*. Springer, Berlin, 2007. 12

[123] Elisabeth Corell. **Dryland Degredation - Africa's Main Environmental Challenge**. In Beatrice Chaytor and Kevin R. Gray, editors, *International Environmental Law and Policy in Africa*. Kluwer Academic Publishers, Dordrecht, The Netherlands, 2003. 12, 13

[124] Jimin Zhao. **Implementing International Environmental Treaties in Developing Countries: China's Compliance with the Montreal Protocol**. *Global Environmental Politics*, **58**(81):377–411, 2005. 12, 38

[125] Lester Ross. **China: Environmental Protection, Domestic Policy Trends, Patterns of Participation in Regimes and Compliance with International Norms**. *The China Quarterly*, **156**:809–835, 1996. 12

[126] Jimin Zhao, , and Leonard Ortolano. **The Chinese Government's Role in Implementing Multilateral Environmental Agreements: The Case of the Montreal Protocol**. *The China Quarterly*, **175**:708–725, 2003. 12

[127] Tannetje Lien Bryant and Keith Akers. **Environmental Controls in Vietnam**. *Environmental Law*, **29**(1), 1999. 12

[128] David Quammen. **Africa's New Parks**. National Geographic Society, 2005. http://ngm.nationalgeographic.com/ngm/0309/feature3/fulltext.html. 12

[129] The Wildlife Conservation Society. **Gabon Sets Aside 10 Percent of Country as Protected Parks**. WCS press release, 2005/09/24. http://news.mongabay.com/2005/0924-gabon.html. 12

[130] ZSL. **Gabon and Lopé National Park**. The Zoological Society of London, Accessed: 2013/02/28. https://www.zsl.org/conservation/regions/africa/gorilla-mikongo/gabon-and-lope-national-park,959,AR.html. 12

[131] UNESCO. **Volume 1: Resolutions Recommendations**. United Nations Educational, Scientific and Cultural Organization: Records of the General Conference Seventeenth Session (Paris), 1972. http://unesdoc.unesco.org/images/0011/001140/114044e.pdf. 12

[132] Julie Owono. **Gabon's UNESCO Bailout: International Solidarity at What Price?** Global Voices, 2011/11/18. http://globalvoicesonline.org/2011/11/18/gabons-unesco-bailout-international-solidarity-at-what-price/. 12

[133] Division for Ocean Affairs and the Law of the Sea, Office of Legal Affairs, United Nations. **The United Nations Convention on the Law of the Sea (A historical perspective)**. United Nations - Office of Legal Affairs, 2012. http://www.un.org/Depts/los/convention_agreements/convention_historical_perspective.htm. 13

[134] CCD. **About the Convention**. UNCCD, 2012. http://www.unccd.int/en/about-the-convention/Pages/About-the-Convention.aspx. 13

[135] UN Convention to Combat Desertification. **About Us**. The Global Mechanism, 2013. http://www.global-mechanism.org/en/About-Us/About-Us. 13

[136] CMS. **CMS Code of Conduct for Partnership with the Private Sector**. UNEP/CMS Secretariat, 2004. http://www.cms.int/about/partnerships/code_of_conduct.pdf. 15, 48

[137] CMS. **Introduction to the Convention on Migratory Species**. UNEP/CMS Secretariat, 2004. http://www.cms.int/about/intro.htm. 15

[138] Ramsar Convention Convention on Wetlands of International Importance especially as Waterfowl Habitat. **The Convention on Wetlands text, as amended in 1982 and 1987**. Director, Office of International Standards and Legal Affairs United Nations Educational, Scientific and Cultural Organization (UNESCO), 1994/07/13. 15

[139] Michael Grubb and Joanna Depledge. **The Seven Myths of Kyoto**. *Climate Policy*, **1**:269–272, 2001. 16

[140] Jana von Stein. **Do Treaties Constrain or Screen? Selection Bias and Treaty Compliance**. *American Political Science Review*, **99**(4):611–622, 2005. 19

[141] Garrett Hardin. **The Tragedy of the Commons**. *Science*, **162**:1243–1248, 1968. 19, 154

[142] Scott Barrett. **The Strategy of Trade Sanctions in International Environmental Agreements**. *Resource and Energy Economics*, **19**(4):345–361, 1997. 19, 154

[143] Scott Barrett. *Environment and Statecraft: The Strategy of Environmental Treaty-Making*. Oxford University Press, Oxford and New York, 2003. 19, 46, 154

[144] Michael Finus. **Stability and Design of International Environmental Agreements: The Case of Transboundary Pollution**. In H. Folmer and T. Tietenberg, editors, *International Yearbook of Environmental and Resource Economics*. Edward Elgar, Cheltenham, UK, 2003. 19, 154

[145] Michael Finus. **Game Theoretic Research on the Design of International Environmental Agreements: Insights, Critical Remarks, and Future Challenges**. *International Review of Environmental and Resource Economics*, **2**:29–67, 2008. 19, 154

[146] Richard Elliot Benedick. *Ozone Diplomacy: New Directions in Safeguarding the Planet*. Havard University Press, Cambridge, MA, 1998. 19

[147] Michael Hoel. **Global Environmental Problems: The Effects of Unilateral Actions Taken by One Country**. *Journal of Environmental Economics and Management*, **20**(1):55–70, 1991. 19

[148] John Pezzey. **Analysis of Unilateral CO_2 Control in the European Community and OECD**. *The Energy Journal*, **13**(3):159–171, 1992. 19

[149] Scott Barrett. **Political Economy of the Kyoto Protocol**. *Oxford Review of Economic Policy*, **14**(4):20–39, 1998. 19

[150] Alain Bernard, Sergey Paltsev, John M. Reilly, Marc Vielle, and Laurent Viguier. **Russia's Role in the Kyoto Protocol**. MIT Joint Program on the Science and Policy of Global Change. Report No. 98., 2003. 19, 153

[151] Laura A. Henry and Lisa McIntosh Sundstrom. **Russia and the Kyoto Protocol: Seeking an Alignment of Interests and Image**. *Global Environmental Politics*, **7**(4):47–69, 2007. 19, 38, 44, 60, 153

[152] Kevin Jianjun Tu. **Future Prospects of China's Policy on Climate Change**. *China Brief*, **9**(1), 2009. 19, 153

[153] Elizabeth R. DeSombre. **The Experience of the Montreal Protocol: Particularly Remarkable and Remarkably Particular**. *UCLA Journal of Environmental Law and Policy*, **19**:49–81, 2000-2002. 20, 36, 153

[154] Paul G. Harris. **Preface**. In Paul G. Harris, editor, *China's Responsibility for Climate Change: Ethics, Fairness, and Environmental Policy*. The Policy Press, Bristol, UK, 2011. 20, 154

[155] David Humphreys. *Forest Politics: The Evolution of International Cooperation*. Earthscan Publications Ltd., London, UK, 1996. 20

[156] William Mark Adams. *Green Development: Environment and Sustainability in the Third Worlds*. Routledge, New York, NY, 1990. 20

[157] Alan Grainger. **Sustainable Development and International Relations**. In Martin Purvis and Alan Grainger, editors, *Exploring Sustainable Development: Geographical Perspectives*. Earthscan, London, UK, 2004. 20

[158] Charles Lipson. **International Cooperation in Economic and Security Affairs**. *World Politics*, **37**(1):1–23, 1984. 20

[159] Dinah Shelton. **Human Rights, Environmental Rights, and the Right to Environment**. *Stanford Journal of International Law*, **28**:103–138, 1991. 20

[160] Paola Conconi and Carlo Perroni. **Issue linkage and Issue Tie-in in Multilateral Negotiations**. *Journal of International Economics*, **57**(2):423447, 2002. 20

[161] Robert O. Keohane and David G. Victor. **The Regime Complex for Climate Change**. *Perspectives on Politics*, **9**(1):7–23, 2011. 20

[162] James R. Hollyer and B. Peter Rosendorff. **Why Do Authoritarian Regimes Sign the Convention Against Torture? Signaling, Domestic Politics and Non-Compliance**. *Quarterly Journal of Political Science*, **6**(3-4):275–327, 2011. 21, 26, 83, 152

[163] Xun Cao and Hugh Ward. **Constituency Size, Extractive State Capacity, and Pollution: Environmental Implications from an Authoritarian Politics Model**. Working Paper, 2012. 21, 71

[164] Joseph Wright. **How Foreign Aid Can Foster Democratization in Authoritarian Regimes**. *American Journal of Political Science*, **53**(3):552–571, 2009. 21, 44, 61, 87

[165] Joseph Wright. **Do Authoritarian Institutions Constrain? How Legislatures Affect Economic Growth and Investment**. *American Journal of Political Science*, **52**(2):322–343, 2008. 21, 30, 36, 71, 72, 95, 96, 126, 152

[166] Scott Gehlbach and Philip Keefer. **Investment Without Democracy: Ruling-Party Institutionalization and Credible Commitment in Autocracies**. *Journal of Comparative Economics*, **39**(2):123–139, 2011. 21, 30, 36, 71, 72, 152

[167] Scott Gehlbach and Philip Keefer. **Private Investment and the Institutionalization of Collective Action in Autocracies: Ruling Parties and Legislatures**. *Journal of Politics*, Forthcoming. 21, 30, 152

[168] Brian Lai and Dan Slater. **Institutions of the Offensive: Domestic Sources of Dispute Initiation in Authoritarian Regimes**. *American Journal of Political Science*, **50**(1):113–126, 2006. 21, 26, 83, 152

[169] Jessica L. Weeks. **Autocratic Audience Costs: Regime Type and Signaling Resolve**. *International Organization*, **63**(1):35–64, 2008. 21, 26, 83, 152

[170] Hanne Fjelde. **Generals, Dictators, and Kings: Authoritarian Regimes and Civil Conflict, 19732004**. *Conflict Management and Peace Science*, **27**:195–218, 2010. 21

[171] Bumba Mukerjee and Benjamin E. Bagozzi. **IMF Structural Adjustment Programs, Authoritarian Legislatures and Currency Crises**. Paper presented at the Tools of International Pressure Conference: Yale University, June 1-2, 2012, 2012. 21, 26, 83, 152

[172] Edward C. Epstein. **Legitimacy, Institutionalization, and Opposition in Exclusionary Bureaucratic-Authoritarian Regimes: The Situation of the 1980s**. *Comparative Politics*, **17**(1):37–54, 1984. 23

[173] Terry Lynn Karl. **Petroleum and Political Pacts: The Transition to Democracy in Venezuela**. *Latin American Research Review*, **22**(1):63–94, 1987. 23

[174] Jong-Chan Rhee. *The State and Industry in South Korea: The Limits of the Authoritarian State*. Routledge, New York, NY, 1994. 23

[175] Benedict Mander. **Venezuela: Up in Smoke**. Financial Times, 2012/06/16. http://www.ft.com/intl/cms/s/0/e0cdedba-fe4e-11e1-8228-00144feabdc0.html. 23, 34, 80, 87

[176] Dale Story. **Industrial Elites in Mexico: Political Ideology and Influence**. *Journal of Interamerican Studies and World Affairs*, **25**(3):351–376, 1983. 23

[177] Thomas Fuller. **Malaysian Prime Minister Announces Resignation**. New York Times, 2008/08/08. http://www.nytimes.com/2008/10/09/world/asia/09malay.html?ref=abdullahahmadbadawi. 24

[178] The World Bank. ***World Development Indicators 2011***. The World Bank, 2011. 24, 67, 72, 94, 95

[179] Barbara Geddes, Joseph Wright, and Erica Frantz. **New Data on Autocratic Breakdown and Regime Transitions**. 2013. 25, 71, 80, 90, 95, 123, 124, 125, 126, 127, 128, 134

[180] Dieter Nohlen and Philip Stöver. *Elections in Europe: A Data Handbook*. Oxford University Press, Oxford, UK, 2001. 25, 131, 133, 134, 135

[181] Europa Publications. *Africa South of the Sahara (33rd Edition 2004)*. Europa Publications, London, UK, 2003. 25, 132, 133, 141

[182] BBC News. **Q&A: Comoros elections**. BBC News, 2006/04/14. http://news.bbc.co.uk/2/hi/africa/4909228.stm. 25, 133

[183] Afrol News. **Election date for Guinea proposed**. afrol News, 2010/02/22. http://www.afrol.com/articles/35415. 25, 136

[184] Barbara Geddes, Joseph Wright, and Erica Frantz. **Autocratic Regimes Code Book: Version 1.1**. 2013. 25, 90, 111, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 135, 136, 137, 138, 140, 141, 142, 145, 152

[185] Scott Barrett. **International Cooperation for Sale**. *European Economic Review*, **45**(10):1835–1850, 2001. 29, 44

[186] Witold J. Henisz and Oliver E. Williamson. **Comparative Economic Organization–Within and Between Countries**. *Business and Politics*, **1**(3):261–277, 1999. 30, 36

[187] Charles E. Stevens and Joseph T. Cooper. **A Behavioral Theory of Governments' Ability to Make Credible Commitments to Firms: The Case of the East Asian Paradox**. *Asia Pacific Journal of Management*, **27**(4):587–610, 2010. 30, 87, 119

[188] Jennifer Clapp. **Transnational Corporate Interests and Global Environmental Governance: Negotiating Rules for Agricultural Biotechnology and Chemicals**. *Environmental Politics*, **12**(4):1–2, 2003. 33, 47

[189] David L. Levy and Peter Newell. **Oceans Apart?** *Environment*, **42**(9):8–20, 2000. 33, 47

[190] Ian H. Rowlands. **The Fourth Meeting of the Parties to the Montreal Protocol: Report and Reflection**. CSERGE Working Paper GEC 93-18, 2010. 33, 47

[191] Sejal Choksi. **The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal: 1999 Protocol on Liability and Compensation**. *Ecology Law Quarterly*, **28**:509–539, 2001-2002. 33, 47

[192] Tim Forsyth. **Industrialization in Vietnam**. In Richard M. Auty and Katrina Brown, editors, *Approaches to Sustainable Development*. Biddles Ltd, Guildford and King's Lynn, London, 1997. 33, 46

[193] Miranda A. Schreurs. **Climate Change Politics in an Authoritarian State: The Ambivalent Case of China**. In John S. Dryzek, Richard B. Norgaard, and David Schlosberg, editors, *The Oxford Handbook of Climate Change and Society*. Oxford University Press, New York, 2011. 33, 35, 45, 46, 150

[194] Reuters. **China Punishes Cities for Polluting Rivers**. Thompson Reuters, 2007/07/04. 33

[195] Marquita K. Hill. *Understanding Environmental Pollution - Third Edition*. Cambridge University Press, Cambridge, UK, 2010. 33

[196] Hua Wang, Nlandu Mamingi, Benoit Laplant, and Susmita Dasgupta. **Incomplete Enforcement of Pollution Regulation: Bargaining Power of Chinese Factories**. *Evironmental and Resource Economics*, **24**(3):245–262, 2003. 33

[197] Jack Hirshleifer. **The Paradox of Power**. *Economics & Politics*, **3**(3):177–200, 1991. 33, 39

[198] Stergios Skaperdas. **Contest Success Functions**. *Economic Theory*, **7**(2):283–290, 1996. 33, 39

[199] Youssef Cohen. **Democracy from Above: The Political Origins of Military Dictatorship in Brazil**. *World Politics*, **40**(1):30–54, 1987. 34, 87

[200] Thomas E. Skidmore. *Politics in Brazil*. Oxford University Press, Oxford, 1967. 34, 87

[201] E. Gyimah-Boadi. **Civil Society in Africa**. *Journal of Democracy*, **7**(2):118–132, 1996. 34, 87

[202] Yun han Chu. *Crafting Democracy in Taiwan*. Institute for National Policy Research, Taipei, 1992. 34, 87

[203] William Kazer and Kersten Zhang. **China's Environmental Protection Racket**. Wall Street Journal, 2013/02/03. http://blogs.wsj.com/chinarealtime/2013/02/01/chinas-environmental-protection-racket/. 34, 150

[204] BBC. **Whistle blown on illegal CFC trade**. BBC World Service, 2004/01/31. http://news.bbc.co.uk/2/hi/science/nature/3442985.stm. 34, 150

[205] Steve Raymer. **Chaotic Russian Economy Deals Environment Blow**. The Record (Kitchener-Waterloo, Ontario), 1992/06/06. 34, 150

[206] Tom Harrison and Genia Kostka. **Manoeuvres for a Low Carbon State: The Local Politics of Climate Change in China and India**. Working Paper Presented at The Princeton Conference on Environmental Politics: Dec. 2-3, 2011, 2011. 35, 150

[207] Stephen P. Mumme, C. Richard Bath, and Valerie J. Assetto. **Political Development and Environmental Policy in Mexico**. *Latin American Research Review*, **23**(1):7–34, 1988. 35, 46

[208] Terezya Pius Luoga Huvisa. **Statement by the Honourable Terezya Pius Luoga Huvisa, Minister of Environment of the United Republic of Tanzania**. UNFCCC, 2010. http://unfccc.int/files/meetings/cop_16/statements/application/pdf/101208_cop16_hls_tanzania.pdf. 35

[209] Cao Duc Phat. **Speech by H.E. Mr. Cao Duc Phat, Minister of Agriculture and Rural Development**. UNFCCC, 2010. http://unfccc.int/files/meetings/cop_16/statements/application/pdf/101209_cop16_hls_vietnam.pdf. 35

[210] BBC News. **China warns on emissions control, howpublished = BBC News, year=2008/10/29, note = http://news.bbc.co.uk/2/hi/asia-pacific/7697929.stm,**. 35, 150

[211] Serguei Blagov. **Vietnam-Environment: Wildlife Threatened by Smugglers, Poachers**. IPS-Inter Press Service, 1996/06/11. 36

[212] The Mercury. **Rhino poaching crackdown**. The Mercury (South Africa), 2013/01/15. 36

[213] AFP. **Cambodian government claims progress in logging crackdown**. Agence France Presse, 1999/03/16. 36

[214] Africa News. **Cameroon; Govt to Accelerate Crackdown On Illegal Forest Exploiters**. Africa News, 2008/08/08. 36

[215] Mancur Olsen. **Dictatorship, Democracy, and Development**. *American Political Science Review*, **87**(3):567–576, 1993. 36, 61, 71, 87

[216] Bruce Bueno de Mesquita, Alistair Smith, Randolph Siverson, and James Morrow. *Logic of Political Survival*. MIT Press, Cambridge, MA, 2003. 36, 44, 61, 87

[217] James A. Robinson. **When is a State Predatory**. Unpublished manuscript, University of Southern California, 1996. 36

[218] Shuhe Li and Peng Lian. **Decentralization and Coordination: China's Credible Commitment to Preserve the Market Under Authoritarianism**. *China Economic Review*, **10**:161–191, 1999. 36, 152

[219] Witold J. Henisz. **The Institutional Environment for Economic Growth**. *Economics & Politics*, **12**(1):1–31, 2000. 36

[220] Carles Boix. *Democracy and Redistribution*. Cambridge University Press, New York, NY, 2003. 36, 95, 152

[221] Aysegul Aydin and Scott Gates. **Rulers as Mass Murderers: Political Institutions and Human Insecurity**. Polarization and Conflict Project Working Paper, 2005. 37

[222] Daron Acemoglu and Simon Johnson. **Unbundling Institutions**. *Journal of Political Economy*, **113**(5):949–995, 2005. 37

[223] Daron Acemoglu, Simon Johnson, and James A. Robinson. **The Rise of Europe: Atlantic Trade, Institutional Change, and Economic Growth**. *American Economic Review*, **95**(3):546–579, 2005. 37

[224] Brownen Maddox. **Russia Uses Kyoto as Bargaining Tool**. The Times (London), 2004/10/01. 38

[225] Frederick W. Mayer. **Managing Domestic Differences in International Negotiations: The Strategic Use of Internal Side-Payments**. *International Organization*, **46**(4):793–818, 1992. 38

[226] Basel Convention. **Overview**. Basel Convention, 2011. http://www.basel.int/TheConvention/FinanceBudget/tabid/1279/Default.aspx. 44

[227] Stockholm Convention. **Implementation**. The Stockholm Convention, 2008. http://chm.pops.int/Implementation/UnintentionalPOPs/Implementation/tabid/218/Default.aspx. 44

[228] Sabrina Birner. **Economic incentives for the conservation of CITES-listed species: Examples from the International Finance Corporation (IFC) Biodiversity Portfolio**. CITES workshop on Economic Incentives, Geneva, 2003. http://www.cites.org/eng/prog/economics/ppt/IFC.pdf. 44

[229] GEF. **What is the GEF**. The Global Environmental Facility, 2012. http://www.thegef.org/gef/whatisgef. 44

[230] GEF. *GEF Country Portfolio Evaluation: Egypt (1991-2008)*. Global Environmental Facility Evaluation Office, Washington, D.C., 2003. 44

[231] Kyudok Hong. **Inter-Korean Environmental Cooperation: Options for Improving Environmental Quality in North Korea**. In In-Taek Hyun and Miranda A. Schreurs, editors, *The Environmental Dimension of Asian Security: Conflict and Cooperation over Energy, Resources, and Pollution*. United States Institute for Peace, Washington D.C., 2007. 45

[232] Bloomberg News. **Chinese CDM Fund to Have $1.5 Billion for Clean-Energy Projects by 2012**. BLOOMBERG L.P., 2010/10/22. http://www.bloomberg.com/news/2010-10-22/china-cdm-fund-to-have-1-5-billion-for-clean-energy-projects-by-2012.html. 45

[233] Eric Sievers. *The Post-Sovient Decline of Central Asia: Sustainable Development and Comprehensive Capital*. Pyschology Press, 2003. 45

[234] J. Tyler Dickovick. *The World Today Series, 2012: Africa*. Stryker-Post Publications, Lanham, MD, 2012. 46

[235] UNEP. *Global Environmental Outlook: 2000*. Earthscan Publications Ltd., London, UK, 1999. 46

[236] Lawrence R. Liebesman and Rafe Petersen. *Endangered Species Deskbook*. Environmental Law Institute, Washington, D.C., 2003. 46

[237] John M. Broder. **A Novel Tactic in Climate Fight Gains Some Traction**. New York Times, 2010/11/08. http://www.nytimes.com/2010/11/09/science/earth/09montreal.html?_r=1&. 46

[238] David Biello. **Climate Talks Consensus: All Countries Should Cut Greenhouse Gas Emissions—In Future**. Scientific American, 2011/12/11. http://www.scientificamerican.com/article.cfm?id=climate-talks-consensus-a. 46

[239] Timothy Doyle and Adam Simpson. **Traversing more than Speed Bumps: Green Politics under Authoritarian Regimes in Burma and Iran**. *Environmental Politics*, **15**(5):750–767, 2006. 47

[240] CCD. **Condsideration of the Role of the Private Sector in the Implementation of the United Nations Convention to Combat Desertification**. UNCCD, 2005. http://www.unccd.int/Lists/OfficialDocuments/cop7/inf4eng.pdf. 48

[241] CCD. **Accreditation Process**. UNCCD, 2012. http://www.unccd.int/en/Stakeholders/civil-society/Accreditation-process/Pages/default.aspx. 48

[242] BBC. **Asia-Pacific Row over Malaysian haze**. BBC News International, 1999/08/06. http://news.bbc.co.uk/2/hi/asia-pacific/413864.stm. 49

[243] Shi Jiangtao. **Cities reluctant to lift haze on pollution data**. South China Morning Post, 2012/01/18. 49

[244] In-Koo Cho and David M. Kreps. **Signaling Games and Stable Equilibria**. *Quarterly Journal of Economics*, **102**(2):179–221, 1987. 57

[245] GEO. **Ratification of Major International Environmental Agreements**. Global Environmental Outlook, 2013. http://maps.grida.no/go/graphic/ratification-of-major-multilateral-environmental-agreements. 64

[246] ENTRI. **COP Treaty list**. The Trustees of Columbia University in the City of New York, 2004. http://sedac.ciesin.columbia.edu/gsametasearch/cop_treatylist.html. 64

[247] Helmut Breitmeier, Oran R. Young, and Michael Zurn. *Analyzing International Environmental Regimes: From Case Study to Database*. The MIT Press, Cambridge, MA, 2006. 64, 95, 151

[248] J. Lawrence Broz and Daniel Maliniak. **Malapportionment, Gasoline Taxes, and Climate Change**. Paper presented at the Political Science Seminar, University of Konstanz, February 3, 2011, 2011. 66, 67, 81

[249] Center for International Earth Science Information Network (CIESIN), Columbia University; International Union for the Conservation of Nature and Natural Resources (IUCN). **Multilateral Environmental Treaty Database**. Socioeconomic Data and Applications Center (SEDAC), Columbia University, 2002. http://sedac.ciesin.columbia.edu/entri/. 66

[250] Christina Schneider and Johannes Urpelainen. **Distributional Conflict Between Powerful States and International Treaty Ratification**. *International Studies Quarterly*, forthcoming. 67, 81

[251] David R. Cox. **Regression Models and Life Tables (with Discussion**. *Journal of the Royal Statistical Society*, **34**:187–220,, 1972. 67

[252] Kristian S. Gleditsch and Michael D. Ward. **Double Take: A Reexamination of Democracy and Autocracy in Modern Polities**. *Journal of Conflict Resolution*, **41**:361–383, 1997. 71

[253] Patrick Regan and David Clark. **The Institutions and Elections Project data collection**. http://www2.binghamton.edu/political-science/institutions-and-elections-project.html, 2010. 71

[254] M. Steven Fish and Matthew Kroenig. *The Handbook of National Legislatures: A Global Survey*. Cambridge University Press, 2009. 71

[255] Barbara Geddes. *Paradigms and Sand Castles*. University of Michigan Press, Ann Arbor, MI, 2003. 71, 80, 95, 126

[256] Maureen Cropper and Charles Griffiths. **The Interaction of Population Growth and Environmental Quality**. *Public Choice*, **84**(2):250–254, 1994. 71

[257] G.M. Grossman and A.B. Krueger. **Economic Growth and The Environment**. *Quarterly Journal of Economics*, **110**:353–377, 1995. 72, 96

[258] Lyle A. Scruggs. *Sustaining Abundance: Environmental Performance in Industrial Democracies*. Cambridge University Press, New York City, NY, 2003. 72, 96

[259] Alan Heston, Robert Summers, and Bettina Aten. **Penn World Table Version 7.0**. Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, 2011. 72

[260] Daron Acemoglu and James A. Robinson. *Economic Origins of Dictatorship and Democracy*. Cambridge University Press, New York City, New York, 2006. 72, 96, 119, 124

[261] Liliana Andonova, Edward D. Mansfield, and Helen V. Milner. **International Trade and Environmental Policy in the Postcommunist World**. *Comparative Political Studies*, **40**(7):782–807, 2007. 72

[262] Albert O. Hirschman. **The Political Economy of Import-Substituting Industrialization in Latin America**. *Quarterly Journal of Economics*, **82**(1):1–32, 1968. 72, 96

[263] John Humphrey. **Industrial Reorganization in Developing Countries: From Models to Trajectories**. *World Development*, **23**(1):149–162, 1995. 72, 96

[264] John A. List and Daniel M. Sturm. **How Elections Matter: Theory and Evidence from Environmental Policy**. *The Quarterly Journal of Economics*, **121**(4):1249–1281, 2006. 73

[265] N. Breslow. **Covariance Analysis of Censored Survival Data**. *Biometics*, **30**(1):89–99, 1974. 78

[266] Bradley Efron. **The Efficiency of Cox's Likelihood Function for Censored Data**. *Journal of the American Statistical Association*, **72**(359):557–565, 1977. 78

[267] The World Bank. *Bureaucrats in Business: The Economics and Politics of Government Ownership*. Oxford University Press, New York, 1995. 79

[268] Richard Robinson. **Toward a Class Analysis of the Indonesian Military Bureaucratic State**. *Indonesia*, **25**:17–39, 1978. 79

[269] Gary H. Jefferson and Thomas G. Rawski. **Enterprise Reform in Chinese Industry**. *The Journal of Economic Perspectives*, **8**(2):47–70, 1994. 79

[270] Edward S. Steinfeld. *Forging Reform in China: The Fate of State Owned Industry*. Cambridge University Press, Cambridge, UK, 1998. 79

[271] Peter Nolan and Wang Xiaoqiang. **Beyond Privatization: Institutional Innovation and Growth in China's Large State-Owned Enterprises**. *World Development*, **27**(1):169–200, 1998. 79

[272] Gabriella Montinola, Yingyi Qian, and Barry R. Weingast. **Federalism, Chinese Style: The Political Basis for Economic Success in China**. *World Politics*, **48**(1):50–81, 1995. 79

[273] Thomas J. Trebat. *Brazil's State Owned Enterprises*. Cambridge University Press, New York, 1983. 79

[274] Shana Marshall and Joshua Stacher. **Egypt's Generals and Transnational Capital**. Middle East Report 262, 2012. http://www.merip.org/mer/mer262/egypts-generals-transnational-capital. 79

[275] BBC. **Hosni Mubarak Resigns: World Reaction**. BBC World Service, 2011/02/12. http://www.bbc.co.uk/news/world-middle-east-12435738. 79

[276] BBC. **Hosni Mubarak: Egypt's Former Leader Given Travel Ban**. BBC World Service, 2011/02/28. http://www.bbc.co.uk/news/world-middle-east-12596133. 79

[277] Thannasis Cambanis. **Succession Gives Army a Stiff Test in Egypt**. New York Times, 2010/09/11. http://www.nytimes.com/2010/09/12/world/middleeast/12egypt.html?pagewanted=all. 79

[278] Al Jazeera. **Army 'Could Block' Egypt Succession**. Al Jazeera, 2010/12/15. http://www.aljazeera.com/news/middleeast/2010/12/20101215810398540 4.html. 79

[279] Al Arabia. **Egyptian Army Planned Mubarak Ouster Before the Revolution: Stratfor Report**. Al Arabia News, 2012/02/28. http://english.alarabiya.net/articles/2012/02/28/197559.html. 80

[280] Jill Crystal. **Coalitions in Oil Monarchies: Kuwait and Qatar**. *Comparative Politics*, **21**(4):427–443, 1989. 80

[281] F. Gregory Gause. *Oil Monarchies: Domestic and Scurity Challenges in the Arab Gulf States*. Council on Foreign Relations, New York, NY, 1994. 80

[282] Jean-Francois Clement and James Paul. **Morocco's Bourgeoisie: Monarchy, State and Owning Class**. *MERIP Middle East Report*, **142**:13–17, 1986. 80

[283] Ingo Walter. **Environmentally Induced Industrial Relocation to Developing Countries**. In S.J. Rubin and T.R. Graham, editors, *Environment and Trade*. Osmun Publishers, Allanheld, 1982. 84, 155

[284] Sean D. Ehrlich. **Why Are Some Democracies Greener than Others? An Access Point Theory of Domestic Institutions and Environmental Regulations**. Working Paper, 2009. 84, 155

[285] Xun Cao and Aseem Prakash. **Trade Competition and Environmental Regulations: Domestic Political Constraints and Issue Visibility**. *Journal of Politics*, **74**(1):66–82, 2012. 84, 155

[286] Jennifer Gandhi and Adam Przeworski. **Authoritarian Institutions and the Survival of Autocrats**. *Comparative Political Studies*, **40**(11):1279–1301, 2007. 94, 123

[287] Jay Ulfelder. **Natural Resource Wealth and the Survival of Autocracies**. *Comparative Political Studies*, **40**(8):995–1108, 2007. 94, 99, 101, 123

[288] Joseph Wright, Erica Frantz, , and Barbara Geddes. **Oil and Autocratic Regime Survival**. Working Paper, 2012. 94, 95, 99, 101, 123

[289] James R. Hollyer and B. Peter Rosendorff. **Do Human Rights Agreements Prolong the Tenure of Autocratic Ratifiers?** *Journal of International Law and Politics*, 2012. 94, 119, 123, 151

[290] Benjamin Smith. **Oil Wealth and Regime Survival in the Developing World: 1960-1999**. *American Journal of Political Science*, **48**(2):232–246, 2004. 94, 95, 99, 101, 123

[291] Gary W. Cox. **Authoritarian Elections and Leadership Succession, 1975-2004**. Paper Presented at the APSA 2009 Annual Meeting, Archived at SSRN, 2009. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1449034. 94, 99

[292] David L. Epstein, Robert Bates, Jack Goldstone, Ida Kristensen, and Sharyn O'Halloran. **Democratic Transitions**. *American Journal of Political Science*, **50**(3):551–569, 2006. 94, 95

[293] Stephen Haber and Victor Menaldo. **Do Natural Resources Fuel Authoritarianism?** *American Political Science Review*, **105**(1):1–26, 2011. 94, 95, 123

[294] George W. Downs. **Constructing Effective Environmental Regimes**. *Annual Review of Political Science*, **3**:25–42, 2000. 95, 151

[295] Carles Boix and Susan Carol Stokes. **Endogenous Democratization**. *World Politics*, **55**(4):517–549, 2003. 95

[296] Carles Boix and Milan Svolik. **The Foundations of Limited Authoritarian Government: Institutions and Power-Sharing in Dictatorships**. SSRN, 2011. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1352065. 96

[297] Steven Levitsky and Lucan A. Way. *Competitive Authoritarianism: Hybrid Regimes After the Cold War*. Cambridge University Press, New York, NY, 2010. 96

[298] Abel Escribaá-Folch and Joseph Wright. **Dealing with Tyranny: International Sanctions and the Survival of Authoritarian Rulers**. *Journal of Development Economics*, **54**(2):335–359, 2010. 96, 101

[299] Thomas C. Cochran. **Did the Civil War Retard Industrialization?** *The Mississippi Valley Historical Review*, **48**(2):197–210, 1961. 96

[300] Richard Stubbs. **War and Economic Development: Export-Oriented Industrialization in East and Southeast Asia**. *Comparative Politics*, **31**(3):337–355, 1999. 96

[301] Cameron G. Thies. **War, Rivalry, and State Building in Latin America**. *American Journal of Political Science*, **49**(3):451–465, 2005. 96

[302] Nils Petter Gleditsch, Peter Wallensteen, Mikael Eriksson, Margareta Sollenberg, and Håvard Strand. **Armed Conflict 1946-2001: A New Dataset**. *Journal of Peace Research*, **35**:615–637, 2002. 96

[303] EM-DAT. **The International Disasters Database**. Center For Research on the Epidemiology of Disasters: CRED, 2009. http://www.emdat.be/database. 96

[304] James J. Heckman. **Dummy Endogenous variables in a Simultaneous Equation System**. *Econmetrica*, **46**(4):931–959, 1978. 97, 98

[305] G. S. Maddala. *Limited Dependent and Qualitative Variables in Econometrics*. Cambridge University Press, Cambridge, MA, 1994. 97, 98

[306] Frederick J. Boehmke. **Unanticipated Delays: A Unified Model of Position Timing and Position Content**. Working Paper: http://polmeth.wustl.edu/mediaDetail.php?docId=44, 2003. 97

[307] Frederick J. Boehmke. **The Influence of Unobserved Factors on Position Timing and Content in the NAFTA Vote**. *Political Analysis*, **14**:421–438, 2006. 97

[308] David B. Carter and Curtis S. Signorino. **Back to the Future: Modeling Time Dependence in Binary Data**. *Political Analysis*, **18**(3):271–292, 2010. 97

[309] Adam Przeworksi and James Raymound Vreeland. **A Statistical Model of Bilateral Cooperation**. *Political Analysis*, **10**(2):101–112, 2002. 98

[310] Jun Xiang. **Relevance as a Latent Variable in Dyadic Analysis of Conflict**. *Journal of Politics*, **72**(2):484–498, 2010. 98, 100

[311] Chiara Monfardini and Rosalba Radice. **Testing Exogeneity in the Bivariate Probit Model: A Monte Carlo Study**. Working Paper, 2006. 98, 99, 102

[312] Chiara Monfardini and Rosalba Radice. **Testing Exogeneity in the Bivariate Probit Model: A Monte Carlo Study**. *Oxford Bulletin of Economics and Statistics*, **70**(2):271–282, 2008. 98, 99, 102

[313] Thomas S. Dee. **Are There Civic Returns to Education?** *Journal of Public Economics*, **88**:1697–1720, 2004. 98

[314] David Dreyer Lassen. **The Effect of Information on Voter Turnout: Evidence from a Natural Experiment**. *American Journal of Political Science*, **49**(1):103–118, 2006. 98

[315] Stephen D. Ansolabehere, Shanto Iyengar, and Adam Simon. **Replicating Experiments Using Aggregate Survey Data: The Case of Negative Advertising**. *American Political Science Review*, **94**(4):901–909, 1999. 98

[316] Joachim Wilde. **Identification of Multiple Equation Probit Models with Endogenous Dummy Regressors**. *Economic Letters*, **69**(3):309–312, 2000. 99

[317] David H. Clark and Patrick M. Regan. **Opportunities to fight: A statistical technique for modeling unobservable phenomena**. *Journal of Conflict Resolution*, **47**(1):94–115, 2003. 100

[318] D. Scott Bennett and Alan Stam. *The Behavioral Origins of War*. University of Michigan Press, Ann Arbor, 2004. 100

[319] Aysegul Aydin. **Choosing Sides: Economic Interdependence and Interstate Disputes**. *Journal of Politics*, **70**(4):1098–1108, 2008. 100

[320] Beth A. Simmons and Zachary Elkins. **The Globalization of Liberalization: Policy Diffusion in the International Political Economy**. *American Political Science Review*, **98**(1):171–189, 2004. 101

[321] Scott Gates, Håvard Hegre, Mark P. Jones, and Håvard Strand. **Institutional Inconsistency and Political Instability: Polity Duration, 1800-2000**. *American Journal of Political Science*, **50**(4):893–908, 2006. 101

[322] G. S. Maddala. **Specification Tests in Limited Dependent Variable Models**. In G. S. Maddala, P. C. B. Phillips, and T. N. Srinivasa, editors, *Advances in Econometrics and Quantitative Economics: Essays in Honor of Professor CR Rao*. Blackwell, Oxford, UK, 1995. 102

[323] Thomas Brambor, William Roberts Clark, and Matt Golder. **Understanding Interaction Models: Improving Empirical Analyses**. *Political Analysis*, **14**:63–82, 2006. 102

[324] William D. Berry, Matt Golder, and Daniel Milton. **Improving Tests of Theories Positing Interaction**. *Journal of Politics*, **XX**(X):1–19, 2012. 103

[325] James Raymond Vreeland. **The IMF: Lender of Last Resort or Scapegoat?** Midwest Political Science Association Annual Meeting,, 1999. 119

[326] Adam Przeworksi and James Raymound Vreeland. **The Effect of IMF Programs on Economic Growth**. *Journal of Development Economics*, **62**(2):385–421, 2000. 119

[327] Andrew K. Rose and Mark M. Spiegal. **Noneconomic Engagement and International Exchange: The Case of Environmental Treaties**. *Journal of Money, Credit, and Banking*, **41**(2-3):337–363, 2009. 119

[328] Oran Young. **Effectiveness of international environmental regimes: Existing knowledge, cutting-edge themes, and research strategies**. *PNAS*, **108**(50):19853–19860, 2011. 119

[329] Carolyn M. Dudek. **Transmitting Environmentalism? The Unintended Global Consequences of European Union Environmental Policies**. *Global Environmental Politics*, **XX**(X):111–129, 2013. 119

[330] Mancur Olsen. **Autocracy, Democracy, and Prosperity**. In Richard J. Zeckhauser, editor, *Strategy and Choice*. MIT Press, Cabmridge, 1991. 119

[331] Raj M. Desai, Anders Olofsgardm, and Tarik Yousef. **The Logic of Authoritarian Bargains**. *Economics & Politics*, **21**:93–125, 2009. 119

[332] Kurt Taylor Gaubatz. **Democratic States and Commitment in International Relations**. *International Organization*, **50**(1):109–139, 1996. 119

[333] Brett Ashley Leeds. **Domestic Political Institutions,Credible Commitments, and International Cooperation**. *American Journal of Political Science*, **43**(4):979–1002, 1999. 119

[334] Henry Kirsch and Jorge Osterling. **Coalition Building in an Emerging Democracy: The Development of a National Drug-Abuse Prevention Plan in Pargauay**. In Henry Kirsch, editor, *Drug Lessons & Education Programs in Developing Countries*. Transaction Publishers, New Brunswick, NJ, 1995. 123

[335] Teresa Garcia-Milá and Therese J. McGuire. **Fiscal Decentralization in Spain: An Asymmetric Transition to Democracy**. In Richard Miller Bird and Robert D. Ebel, editors, *Fiscal fragmentation in decentralized countries*. Elgar, London, 2007. 123

[336] Peter Lewis. **Nigeria: Elections in a Fragile Regime**. *Journal of Democracy*, **14**(3):131–144, 2003. 123

[337] Mauricio Font. **Friendly Prodding and Other Sources of Change in Cuba**. *Comparative Politics*, **63**:573–602, 1996. 123

[338] Timur Kuran. **Now Out of Never: The Element of Surprise in the East European Revolution of 1989**. *World Politics*, **44**(01):7–48, 1991. 123

[339] F. Gregory Gause III. **Why Middle East Studies Missed the Arab Spring: The Myth of Authoritarian Stability**. *Foreign Affairs*, (July/August), 2011. 123

[340] Timur Kuran. **The Inevitability of Future Revolutionary Surprises**. *American Journal of Sociology*, **100**(6):1528–1551, 1995. 123

[341] Claude E. Welch Jr. **Military Disengagement from Politics: Lessons from West Africa**. *Armed Forced & Society*, **9**(4):541–554, 1983. 123

[342] Claude E. Welch Jr. **Ethnic Factors in African Armies**. *Ethnic and Racial Studies*, **9**(3), 1986. 123

[343] Alexandre Sauquet. **The Coup d'Etat in The Gambia, 1994: The End of the First Republic**. *Armed Forces & Society*, **23**(1):97–111, 1996. 123

[344] Daron Acemoglu and James A. Robinson. **Democratization or Repression?** *European Economic Review*, **44**(4-6):683693, 2000. 124

[345] Janet M. Box-Steffensmeier, , and Bradford S. Jones. *Event History Modeling*. Cambridge University Press, New York, 2004. 124

[346] Frank Hoffmeister. *Legal Aspects of the Cyprus Problem: Annan Plan And EU Accession*. Martinus Nijhoff Publishers, Leiden, The Netherlands, 2006. 124, 133

[347] Syed Serajul Islam. **The State in Bangladesh under Zia (1975-81)**. *Asian Survey*, **24**(5):556–573, 1984. 124, 130

[348] Barbara West. *Encyclopedia of the Peoples of Asia and Oceania*. Facts on File, Inc., New York City, New York, 2012. 124, 135

[349] Reuters. **Panama Officials Quit After President Resigns**. New York Times, 1982/08/01. `http://www.nytimes.com/1982/08/01/world/panama-officials-quit-after-president-resigns.html`. 125, 140

[350] Europa Publications. *Europa World Year Book 2, Volume 2 (45th Edition)*. Europa Publications, London, UK, 2004. 125, 140, 141, 142

[351] Robert D. Burrowes. *Historical Dictionary of Yemen*. Scarecrow Press, Inc., Lanham, MD, 2010. 125, 144

[352] Vito D'Orazio, James E. Yonamine, and Philip A. Schrodt. **Predicting Intra-State Conflict Onset: An Event Data Approach Using Euclidean and Levenshtein Distance Measures**. Presented at the 69th annual Midwest Political Science Association meeting, 2011. 125

[353] Benjamin E. Bagozzi. **Forecasting Civil Conflict with Zero Inflated Count Models**. Working Paper, 2012. http://eventdata.psu.edu/papers.dir/Bagozzi.ZICM.2011.pdf. 125

[354] Karen Rasler. **Concessions, Repression, and Political Protest in the Iranian Revolution**. *American Sociological Review*, **61**(1):132–152, 1996. 125

[355] Carol Mueller. **International Press Coverage of East German Protest Events, 1989**. *American Sociological Review*, **62**(5):820–832, 1997. 125

[356] Henry E. Hale. **Regime Change Cascades: What We Have Learned from the 1848 Revolutions to the 2011 Arab Uprisings**. *Annual Review of Political Science*, 2013. 125

[357] Margit Bussmann and Gerald Schneider. **When Globalization Discontent Turns Violent: Foreign Economic Liberalization and Internanal War**. *International Studies Quarterly*, **51**(1):79–91, 2007. 125

[358] Michael Bratton and Nicolas van de Walle. *Democratic Experiments in Africa: Regime Transitions in Comparative Perspective*. Cambridge University Press, Cambridge, UK, 1997. 125

[359] Mark. R. Thompson and Philipp Kuntz. **Stolen Elections: The Case of the Serbian October**. *Journal of Democracy*, **15**(4):159–172, 2004. 125

[360] Lucan A. Way. **Authoritarian State Building and the Sources of Regime Competitiveness in the Fourth Wave: The Cases of Belaurs, Moldova, Russia, and Ukraine**. *World Politics*, **57**(2):231–261, 2005. 125

[361] Jean-Francois Maystadt, Olivier Ecker, and Athur Mabiso. **Extreme Weather and Civil War in Somalia: Does Drought Fuel Conflict through Livestock Price Shocks?** International Food Research Policy Institute (IFPRI) Discussion Paper 01243, 2013. http://www.ifpri.org/sites/default/files/publications/ifpridp01243.pdf. 125

[362] Carlotta Gall and Jeff Zeleny. **Out of Race, Karzai Rival Is Harsh Critic of Election**. New York Times, 2009/11/01. http://www.nytimes.com/2009/11/02/world/asia/02afghan.html?fta=y&_r=0. 129

[363] C. Alan Joyce. *World Almanac & Book of Facts, 2008*. World Almanac Books, New York City, New York, 2007. 130

[364] Dieter Nohlen, Florian Grotz, and Christof Hartmann. *Elections in Asia and the Pacific: A Data Handbook : Volume I: Middle East, Central Asia, and South Asia*. Oxford University Press, Oxford, UK, 2001. 130, 131

[365] BBC News Middle East. **Bahrain Profile: Timeline**. BBC News, 2012/10/30. http://www.bbc.co.uk/news/world-middle-east-14541322. 130

[366] National Democratic Institute for International Affairs (NDI). **Bahrain's October 24 and 31, 2002 Legislative Elections**. NDI, 2002. http://www.ndi.org/files/2392_bh_electionsreport_engpdf_09252008.pdf. 130

[367] Programme on Governance in the Arab Region (POGAR). **Country Theme: Elections: Bahrain**. UNDP, 2011. http://www.webcitation.org/5wNSNDw42. 130

[368] The Hindu: News Update Service. **Border to be sealed ahead of Bhutan polls**. The Hindu, 2007/12/27. http://www.hindu.com/thehindu/holnus/001200712271241.htm. 131

[369] Subir Bhaumik. **Main Bhutan Election Date Is Set**. BBC News, 2008/17/01. http://news.bbc.co.uk/2/hi/south_asia/7193818.stm. 131

[370] Steven Otfinoski. *Nations in Transition: Bulgaria (2nd Edition)*. Facts on File, Inc., New York City, New York, 1999. 131

[371] Edward H. Lawson and Mary Lou Bertucci. *Encylcopedia of Human Rights (2nd Edition)*. Taylor & Francis, Washington D.C., 1998. 132

[372] Guy Arnold. *The A to Z of Civil Wars in Africa*. The Rowman & Littlefield Publishing Group, Inc., Plymouth, UK, 2008. 132

[373] Martin Ottenheimer and Harriet Ottenheimer. *Historical Dictionary of the Comoro Islands*. Scarecrow Press, Inc., United States, 1994. 132

[374] Carlson Anyangwe. *Revolutionary Overthrow of Constitutional Orders in Africa*. Langaa Research & Publishing Common Initiative Group, Bamenda, Cameroon, 2012. 132

[375] Andreas Constandinos. *Intellegence Memorandum: America, Britain and the Cyprus Crisis Of 1974: Calculated Conspiracy Or Foreign Policy Failure?* AuthorHouse UK Ltd., Central Milton Keynes, UK, 2009. 133

[376] Dieter Nohlen. *Elections in the Americas A Data Handbook Volume 1: North America, Central America, and the Caribbean*. Oxford University Press, Oxford, UK, 2005. 134, 136, 143

[377] Tom J. Farer. *The Grand Strategy of the United States in Latin America*. Transaction Books, New Brunswick, NJ, 1988. 134

[378] David Seddon. *A Political and Economic Dictionary of Africa*. Routledge, London, UK, 2005. 134, 138

[379] Michael C. Howard. *Fiji: Race and Politics in an Island State*. UBC Press, Vancouver, BC, 1991. 134

[380] Michael Field, Tupeni Baba, and Unaisi Nabobo-Baba. *Speight of Violence: Inside Fiji's 2000 Coup*. Pandanus Books, Canberra, 2005. 135

[381] Dieter Nohlen, Michael Krennerich, and Berhard Thibaut. *Elections in Africa: A Data Handbook*. Oxford University Press, Oxford, UK, 1999. 135, 142

[382] Thomas M. Leonard. *Encyclopedia of the Developing World: Index. A-E, Volume 1*. Taylor & Francis, Washington D.C., 2006. 135

[383] IRIN. **Election date for Guinea proposed**. IRIN: Humanitarian News and Analysis, a service of the UN Office for the Coordination of Humanitarian Affairs, 1999/09/10. http://www.irinnews.org/Report/9028/GUINEA-BISSAU-PAIGC-chooses-new-chairman-expels-Vieira. 136

[384] Geoff Spencer. **Indonesia's Habibie Withdraws**. Associated Press, 1999/10/19. http://www.apnewsarchive.com/1999/Indonesia-s-Habibie-Withdraws/id-219ba3630e874ce89b1f270942cd9f56. 137

[385] Dieter Nohlen, Florian Grotz, and Christof Hartmann. *Elections in Asia and the Pacific: A Data Handbook : Volume II: South East Asia, East Asia, and the South Pacific*. Oxford University Press, Oxford, UK, 2001. 137

[386] Michael Leifer. *Dictionary of the Modern Politics of Southeast Asia*. Routledge Press, New York, NY, 1995. 138

[387] Reuters. **Maldives Presidential Poll Now Set For Oct. 8**. Thompson Reuters, 2008/09/17. http://in.reuters.com/article/2008/09/17/maldives-politics-idINCOL19257120080917. 139

[388] CENTCOM. **Political Development of Nepal**. United States Central Command, 2013. http://www.centcom.mil/nepal/. 139

[389] The Independent. **Babangida Annuls Presidential Election: Britain Freezes Aid as Nigeria Military Pulls Back from Democracy**. The Independent, 1993/24/06. 140

[390] BBC News. **Musharraf Vows Polls in February**. BBC News, 2007/08/11. http://news.bbc.co.uk/2/hi/south_asia/7084839.stm. 140

[391] Asofou So'o. **The Establishment and Operation of Samoa's Political Party System**. In Roland Rich, Luke Hambly, and Michael G. Morgan, editors, *Political Parties in the Pacific Islands*. Pandanus Books, Canberra, 2005. 141

[392] Liam Campling, Hansel Confiance, and Marie-Therese Purvis. *Social Policies in Seychelles*. Commonwealth Secretariat, London, UK, 2011. 142

[393] Mohamed H. Fadlalla. *Short History of Sudan*. iUniverse, Inc., Lincoln, NE, 2004. 143

[394] Jorge I. Domínguez. *Democratic Politics in Latin America and the Caribbean*. The Johns Hopkins University Press, Baltimore, MD, 1998. 143

[395] Europa Publications. *Europa World Year Book 2007, Volume 2*. Europa Publications, London, UK, 2007. 144

[396] IBP USA Staff. *Zambia Country: Strategic Information and Developments*. International Business Publications, Washington D.C., 2013. 145

[397] Barlett C. Jones. *Flawed Triumphs: Andy Young at the United Nations*. University Press of America, Lanham, MD, 1996. 145

[398] Christian Davenport. **Human Rights and the Democratic Proposition**. *Journal of Conflict Resolution*, **43**(1):92–116, 1999. 151

[399] Christian Davenport and David A. Armstrong II. **Democracy and the Violation of Human Rights: A Statistical Analysis from 1976 to 1996**. *American Journal of Political Science*, **48**(3):538–554, 2004. 151

[400] Jon C. Pevehouse. **Democracy from the Outside-In? International Organizations and Democratization**. *International Organization*, **56**(3):515–549, 2002. 151

[401] Jon C. Pevehouse. **With a Little Help from My Friends? Regional Organizations and the Consolidation of Democracy**. *International Organization*, **46**(3):611–626, 2002. 151

[402] Jon C. Pevehouse. *Democracy from Above: Regional Organizations and Democratization*. Cambridge University Press, Crambidge, UK, 2005. 151

[403] Corey J. A. Bradshaw, Xingli Giam, and Navjot S. Sodhi. **Evaluating the Relative Environmental Impact of Countries**. *PLoS One*, **5**(5):e10440, 2010. 155

[404] J.W. Emerson, A. Hsu, M.A. Levy, A. de Sherbinin, V. Mara, D.C. Esty, and M. Jaiteh. **2012 Environmental Performance Index and Pilot Trend Environmental Performance Index**. New Haven: Yale Center for Environmental Law and Policy, 2012. 155

[405] Heski Bar-Isaac. **Reputation and Survival: Learning in a Dynamic Signalling Model**. *Review of Economic Studies*, **70**(2):231–251, 2003. 156

[406] Brendan Daley and Erik Snowberg. **Even if it is not Bribery: The Case for Campaign Finance Reform**. *Journal of Law, Economics & Organization*, **27**(2):324–349, 2011. 156

[407] Francesc Dilmé. **Dynamic Quality Signaling with Moral Hazard**. PIER Working Paper No. 12-012, 2012. 156

[408] David M. Blei, Andrew Y. Ng, and Michael I. Jordan. **Latent Dirichlet Allocation**. *The Journal of Machine Learning Research*, **3**:993–1022, 2003. 158

[409] K. Torkkola. **Discriminative features for text document classification**. *Formal Pattern Analysis & Applications*, **6**(4):301–308, 2004. 158

[410] UN. **The United Nations Commodity Trade Statistics Database (UN Comtrade)**. United Nations http://comtrade.un.org/db/default.aspx, 2010. 158

[411] Kalev Leetaru and Philip A. Schrodt. **GDELT: Global Data on Events, Location and Tone, 1979-2012. Version 1.0.** Paper Presented at the 2013 ISA Annual Meeting, 2013. http://eventdata.psu.edu/papers.dir/ISA.2013.GDELT.pdf. 159

Declaration

I herewith declare that I have produced this paper without the prohibited assistance of third parties and without making use of aids other than those specified; notions taken over directly or indirectly from other sources have been identified as such. This paper has not previously been presented in identical or similar form to any other American or foreign examination board.

The thesis work was conducted from 2011 to 2013 under the supervision of Bumba Mukherjee at The Pennsylvania State University.

Benjamin E. Bagozzi **VITA** **April 16th, 2013**

CONTACT INFORMATION

Pond Lab 228
Department of Political Science
The Pennsylvania State University
University Park, PA 16802 USA

Office: (814) 863-8812
Fax: (814) 863-8979
E-mail: beb196@psu.edu
Web: http://www.BenjaminBagozzi.com

EDUCATION

The Pennsylvania State University, University Park, Pennsylvania USA

Ph.D. Candidate, Political Science, May 2011 (expected graduation date: August 2013)

- Dissertation: *Strategies of Environmental Treaty Participation by Authoritarian Regimes*
- Committee: Bumba Mukherjee (Chair), Karen Fisher-Vanden, Phil Schrodt, and Chris Zorn
- Fields: International Relations, Political Methodology and Comparative Politics

M.A., Political Science, May 2010

- Master's Essay: *Electoral Institutions and Industry Access to Safeguard Protection*

University of California, San Diego, San Diego, California USA

M.P.I.A., International Politics (regional focus: Latin America), May 2008

Michigan State University, East Lansing, Michigan USA

B.A., Psychology, December 2005

B.A., Spanish, December 2005

Interuniversity Consortium for Political and Social Research, Ann Arbor, Michigan USA

Mathematics for Social Scientists II, Summer 2006

Simultaneous Equation Models, Summer 2009

ARTICLES

Bagozzi, Benjamin E. and Steven T. Landis. *Forthcoming.* "The Stabilizing Effects of International Politics on Bilateral Trade Flows." *Foreign Policy Analysis.*

Mukherjee, Bumba and Benjamin E. Bagozzi. 2013."The IMF, Domestic Public Sector Banks and Currency Crises in Developing States." *International Interactions.* 39(1): 1-29.

Bagozzi, Benjamin E. and Bumba Mukherjee. 2012. "A Mixture Model for Middle-category Inflation in Ordered Survey Responses." *Political Analysis.* 20(3): 369-386.

BOOK CHAPTERS

Schrodt, Philip A., James Yonamine, and Benjamin E. Bagozzi. 2013. "Data-based Computational Approaches to Forecasting Political Violence." V.S. Subrahmanian (ed.). *Handbook of Computational Approaches to Counterterrorism.* Springer Press.

HONORS AND AWARDS

Jesse M. MacKnight Memorial Graduate Scholarship, 2012
Big Data Social Science IGERT Affiliate, 2012
Quantitative Social Sciences Initiative (QuaSSI) Predoctoral Fellow, 2012
Outstanding Political Science Graduate Student Award, 2012
College of Liberal Arts Forrest Crawford Graduate Scholarship, 2011
The Pennsylvania State University Best M.A. Essay in Political Science, 2010
Program in Empirical International Relations (PEIR) Graduate Research Fellowship, 2010 (*declined*)
Michigan State University: Graduated with honors, Psi Chi, Phi Beta Delta, 2005