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Beyond Economics and Security:
Strategic Export Control Practices in Advanced Countries

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Abstract

Beyond Economics and Security:
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How do like-minded countries decide which sensitive technologies they will export to countries of concern? When the economic and security stakes are high, what factors contribute to effective strategic export control policy? To answer these questions, my study focuses on the routine, domestic, and bureaucratic implementation of multilateral and national-level export controls. The optimist assumes that countries, or at least allies, engage in similar export control practices. Yet the reality is unlikely to be so simple. If like-minded countries do not implement export controls similarly, we need to know why. To create a more coherent strategic export control policy among the advanced industrial democracies, we must start with a better understanding of the factors that drive officials' decision-making. I therefore examine US, UK,

and Japanese exports of high-tech, militarily sensitive exports to China—the most strategically significant importer—from the late 1990s to the present. In examining these cases, this study combines insights from bureaucratic politics and psychology in a novel way to shine light on how countries resolve competing pulls from economics, security, and politics. It also provides information useful to researchers and governments interested in the implementation of multilateral policy. My findings highlight the causes of variation in domestic implementation of multilateral policies in the hopes that states can better prevent grave security threats, including weapons of mass destruction (WMD) proliferation.

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DEDICATION

For my family

Chapter 1. STRATEGIC EXPORT CONTROLS

“Export controls are nothing more than politics wrapped around technology.”

– Don Weadon, Esq., cited by Carol Kalinoski, Esq., former chairperson of the Interagency Operating Committee on Export Policy (OC), Bureau of Industry and Security (BIS), US Department of Commerce

1.1 INTRODUCTION

In December 2013, the 41 members of the Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-Use Goods and Technologies unanimously agreed to add surveillance systems¹ to the list of controlled exports. Discoveries that Western surveillance technologies had contributed to human rights abuses in countries such as Egypt, Syria, the United Arab Emirates, and Bahrain in their response to the Arab Spring were behind this move. The European Union (EU) quickly moved to implement the new surveillance technology controls, accomplishing this without much fanfare in 2014. Member states including UK and France, the countries that had tabled the proposal at the Wassenaar Arrangement (WA), have implemented the rules domestically.

Yet the experience of the United States, a founding member of the WA, was very different from that of Europe. The Department of Commerce’s Bureau of Industry and Security (BIS) took the unusual step of opening up the domestic implementation process to public comment in March

¹ Specifically, intrusion software and IP network surveillance systems.

2015. The response was overwhelmingly negative. US corporations, including Google, Microsoft, and Symantec, members of Congress, and civil society representatives balked at the new proposed implementation due to the potential negative impact on security research and Internet freedom more generally. In light of the reaction, the Departments of Commerce and State agreed to renegotiate the agreement this year and in March 2016, said they would propose removing the controls on surveillance technologies at the next WA plenary.

Why have the United States and allies such as the UK or France taken such different approaches and positions in their domestic implementation of export controls on surveillance systems, despite having initially agreed to the controls at the multilateral level? Potential explanations include the structure of the countries' respective export control systems, the strength of the relevant industries in each country, or views on the actual human rights threat surveillance systems pose.

This still-ongoing debate over surveillance software highlights several issues in the contemporary practice of export controls. Difficulties include a shift away from US-led export controls practices during the Cold War, how states control the exports of so-called "intangible technology,"² and post-Cold War confusion about the purpose and targets of export controls. Another challenge is whether WA can handle non-traditional security including human rights, for which it was not designed when established two decades ago. This debate highlights four broad issues in the field of export controls that I highlight in my dissertation.

² The surveillance system controls also invoke memories of so-called crypto wars of the 1990s, in which the United States and other Western governments attempted to control public and foreign access to strong cryptography that could resist government decryption.

The first one is the tension between states over which items they agree to control. At the international level, export controls present a Prisoner's Dilemma, in which the security of all states would be better off if they all controlled the same technologies, but in which one state always has an economic incentive to defect.³ Defection (exporting a controlled technology when others do not) would negatively impact the security and economies of the other states who cooperate (in this case, restrict exports).

The second, related issue is how member states implement multilateral export controls, since they are neither founded in international law nor enforceable. Many researchers have pointed to the lack of comparative data on the implementation of export controls, even among the most advanced producer states. Industry representatives and governments alike are concerned with creating an "equal playing field" for all exporters.

The third issue is the challenge of so-called dual-use goods and technologies—which are items intended for commercial or civilian uses but which also have military applications or proliferation potential. These technologies have economic significance because they have important commercial uses but potential security externalities accompany their export.

This leads to the fourth issue in export controls: that tension exists within states on the externalities of controlling dual-use trade. Actors focused on restricting the export of certain items for national security reasons must contend with other actors who champion economic gain, free trade, or engagement with potential adversaries through trade.

³ As Cupitt notes, "Generally, export restrictions inflict concentrated costs, usually imposed on powerful domestic industries. At the same time, controls on dual-use exports provide diffuse and indivisible security benefits" (2000, 3)

1.2 RESEARCH QUESTIONS

Advanced countries export billions of dollars a year of technologies that have significant potential military or WMD applications. These are not “arms,” the export of which has already received due academic attention, but rather “dual-use” items primarily created with commercial or civilian purposes. Many of these dual-use technologies are subject to multilateral and national export controls. Governments must review and approve each license application for the legal export of a controlled dual-use item. This poses a dilemma—governments must balance their economic, security, and other interests in deciding whether to approve the export of a controlled technology.

More vexing, even if a country decides to forgo the economic benefits of export, if other similar producer countries undercut it, the first country’s security benefit is moot. This dilemma is heightened in exports to destinations of concern, such as Iran or China, which may represent important export markets. Research and official government reports suggest that advanced industrial democracies differ in their willingness to export sensitive technologies to countries of concern, including China—despite a long-standing multilateral arms embargo against it.

How similar are advanced countries’ practices of dual-use export controls, particularly to countries of concern? If similar countries indeed exhibit different patterns of export control implementation, what explains these differences? I use competing explanations to assess the drivers of dual-use export licensing decisions of three major dual-use technology producers—the United States, the UK, and Japan—particularly to destinations they have identified as “countries of concern.” I draw different levels of foreign policy analysis to explain both divergence among different countries in the exports of the same technologies and divergence on exports of different technologies within the same country.

My dissertation has two goals. One is to uncover variance in the implementation of export controls on major exports of sensitive technologies or goods. The other is to explain reasons for this variation where it exists.

I begin my study by showing that, despite the lack of quantitative data but consistent with some reports, states' implementation of dual-use export controls does indeed vary, even among similar exporters on the same technologies. I then offer an explanation for the variance in export control implementation both *across* countries on the *same* technologies and *within* countries on *different* technologies.

The standard economics versus security tension (which roughly correspond to the liberal and realist approaches to international relations, respectively) that states face in the control of dual-use exports, I argue, is only a part of the whole story. I posit that bureaucratic and technology-specific factors also affect export control decisions in predictable ways, and that including these variables in my analysis will help us better understand governmental decision-making.

Dual-use export control policy diverges from types of foreign policies that most political scientists have studied, which often involve decisions made in times of crisis, domestic public policy, national security-related policy, or trade policy (such as World Trade Organization negotiations). Yet dual-use trade policy concerns both security and economic policy. In the case of the United States, it involves the Commerce Department, the State Department, and the Defense Department, along with other agencies such as the Department of Energy.

Issuing a license to export a dual-use technology is a routine issue, representative of non-crisis policy implementation that is highly technical and bureaucracy-driven. Studies in this field contrast with existing studies on policy issue areas that focus on the roles of the President or other powerful individuals, or on topics that have heightened public interest, such as environmental

treaties. Nevertheless, strategic trade policy implementation can have a profound effect on both national and international security. Conducting a rigorous analysis in this domain has the potential to provide valuable new insights into state interests in security, economics, and more.

I expand on findings from Jones' case study on US exports to Iraq prior to the Iraq-Iran War (1999) and test if a bureaucratic politics variable—namely, defense agency involvement—can explain varying levels of controlled exports of the same technologies across similar countries in a later time period than he studies. I also analyze to what degree specific concerns that the technologies present—ranging from proliferation to military applications to human rights—affect exports of the relevant item to certain destinations.

I also draw on a political psychology approach to salience to suggest that we consider the interaction among the country's multiple objectives in practicing export controls (such as safeguarding human rights or national security), the type of concern a technology presents, and the kind of threat concerns a potential export recipient invokes. I believe the bureaucratic politics and psychological variables can explain the outcome of export control implementation as well as or better than traditional economic and security variables. At the very least, they add extra explanatory power to understand patterns of export control implementation among and within states.

1.3 PUZZLE: DIVERGENCE IN IMPLEMENTATION OF EXPORT CONTROLS

While the United States has traditionally been the strongest proponent of export controls, as can be seen in the recent example of surveillance technology controls, the United States is not always the most forward-leaning country on export control implementation. While the 41 members of WA

are supposedly “like-minded,” even among like allies we see divergence in the implementation of multilateral export controls.

In my interviews over two years with export control practitioners and researchers in the United States, Europe, and Japan, I found a recurring belief that variation in the implementation of export controls, even among similar countries on the same technologies, is only natural. Divergence results from differences in foreign policy, geopolitical, and economic considerations. Others, however, expect little difference in implementation among similar countries on most sensitive technologies, given their similar bureaucratic capacity and the consensus hammered out on the sensitivity of certain technologies at the multilateral level.

Most interviewees and reports agreed on one reality, however: that China is one of the main points of divergence between advanced countries. Just how much do controlled dual-use exports to China, one of the world’s most important markets, differ among advanced industrial exporters?

A National Research Council report argues that when it comes to WA,

Its members disagree about which countries are states of concern—particularly with regard to China—and what constitutes a destabilizing dual-use transfer. For example, despite U.S. protests on the transfer of dual-use technology, the EU signed an agreement with China in 2003 that allowed China to invest 230 million Euros in the EU’s satellite navigation system. The members of the Wassenaar Arrangement also foster suspicion toward one another. The United States, for example, is concerned that other members do not take national security threats—and hence, export controls—seriously enough, while several of the other members think that the United States is seeking to use export controls to maintain a competitive advantage in high-technology goods. The net result is that the export control systems of the member states have grown increasingly heterogeneous and asymmetrical, with a growing gap between what is controlled by the United States and what is controlled by everyone else, which has in turn put U.S. exporters at an increasing competitive disadvantage. (2009, 39–40)

This excerpt suggests that export control practices among regime member countries vary due to their different threat perceptions and mistrust of each other, and that exports to China put these issues into especially stark relief. Segal, for instance, points to European and Japanese governments having approved exports of semiconductor manufacturing equipment “that is at least

two generations more advanced than the threshold stipulated by the Wassenaar agreement. When the United States has banned or slowed exports to manufacturers in China, European and Japanese suppliers quickly stepped in to make the sale” (2004).

In the words of another researcher on US advanced trade with China, “The sale of dual-use technology to the PRC...remains a highly divisive issue in the transatlantic relationship, as the large economic interests involved in exporting to China commercially developed dual-use articles clash with the security implications of their potential contribution to China’s military modernization” (Meijer 2014).

Nevertheless, several people I interviewed in Japan have voiced concern that their interpretation of dual-use export restrictions was stricter than that in Europe or even the United States in certain cases. More recently, journal articles based on a special symposium highlights how different countries are all struggling to resolve domestic and international tensions in deciding whether to export sensitive items to China (Cheung and Gill 2013).

States may assume the worst of each other and paint a picture of divergence that is grimmer than reality. Nevertheless, the preceding discussion provides enough preliminary evidence to question whether the assumption that like-minded countries coordinate export controls by technology or by destination appears naïve. Understanding the level to which export control practices are not coordinated is important because if export control implementation is inconsistent, this undermines the purpose of export controls.

1.4 WHY DUAL-USE TECHNOLOGY? THE DUAL-USE DILEMMA

The majority of existing research in international relations has focused on either general trade or the arms trade. Yet general commodities trade and the arms trade both function according to

different logics than dual-use trade. The export of arms always poses a security externality and is primarily conducted for foreign policy reasons—the arms trade itself is not profitable for the country as a whole, because development and sales are so dependent on supplier government subsidies.⁴

Meanwhile, commodities trade does not pose a security externality except in the sense that any country could potentially convert butter into guns. Commodities trade is primarily about making a profit or for special commodities like energy. Yet dual-use goods fall in between the two categories. They are importance sources of revenue for advanced countries (and, increasingly, developing countries as well), yet pose an unquantifiable security risk. Moreover, dual-use goods are increasing in importance as the technological revolution proceeds and countries are shifting from “spin-off” (commercializing military technologies) to “spin-on” (specializing commercial goods for military use) in their military acquisition strategies.

The narrower the gap between military and civil goods becomes, the more vexing this dilemma becomes. Thus, from a practical perspective, a better understanding of trade in dual-use goods will lend insights into this important type of trade, which has been little analyzed in the international relations literature. From a theoretical perspective, investigating dual-use technologies provides insight into how research balances economic and security imperatives, among other facets, more than can the commodities trade or arms trade can.

⁴ See Smith et al. (1985, 241–42).

1.5 DEFINITIONS – KEY TERMS

I adopt the following definition of *export controls*: “Export controls control the transfer out of a state of objects and knowledge of potential security concern” (Evans 2014, 3). Export controls can therefore apply to both tangible (objects, such as computers) and intangible (knowledge, or the encryption algorithms on a computer) items. Further, as Stewart and Dill note, “strategic export controls,” “strategic trade controls (STC),” and “strategic trade management (STM)” are terms experts increasingly used when talking about export controls (2015, 4). I use the term “strategic export controls” to emphasize the economic, security, and political implications of controls. (In their conception, strategic trade management includes imports and trade promotion, which are beyond the scope of this study.) I use the terms “export controls” and “strategic export controls” interchangeably.

A distinction should be made between export controls and sanctions or embargoes.⁵ Sanctions or embargoes can be targeted or comprehensive—“targeted” is generally involving specific items to certain people, where “comprehensive” covers nearly all imports or exports that do not have government authorization. In standard usage, an embargo tends to be broader in scope and means a general prohibition of trade with a country or group of countries while a sanction is an economic penalty prohibiting trade with a country, or people in that country, for political purposes.

While sanctions and embargoes are foreign policy tools, and countries can implement them unilaterally, multilaterally, or the United Nations (UN) or the EU may use them against countries

⁵ Mastanduno’s work on CoCom distinguishes between strategic embargoes, which are prohibitions on trade that contribute to an adversary’s military capabilities, and economic warfare, which aims to weaken the other country by weakening its economy (1992, 13).

in response to actions they protest. The political climate and nature of globalization are such that policymakers today depend more on sanctions than embargoes, and a rich international relations literature investigates sanctions and their effectiveness.

Export controls can be one means of ensuring that exports are not going against these trade restrictions, whether an embargo or a sanction. For example, export controls help keep arms from going to China due to the post-Tiananmen Square US and EU arms embargoes. However, this dissertation focuses on the export controls on specific *items*, which are controlled regardless of their destination.

Contrary to existing work on sanctions or embargoes that are “targeted” toward certain countries or individuals—and which often evaluate how effective these policies are in changing the target’s behavior—I am investigating the regulatory aspect of export controls. In this sense, we cannot determine the effectiveness of export controls by how they affect a target states’ behavior, but rather by whether sensitive technologies are kept out of the hands of risky importers through consistent implementation of multilateral controls.

Export controls are coordinated at the international level at one of four *multilateral export control regimes*, which cover dual-use items and munitions, chemical and biological materials, nuclear materials, and missile technology. Yet these regimes, which are essentially supplier groups created near or after the end of the Cold War, are voluntary and have no enforcement mechanisms. Each state is left to implement controls as it sees fit (this principle is called “national discretion”). The “like-mindedness” of the suppliers is a key element supporting the functioning of the regimes, but it is unclear how far the like-mindedness travels into the domestic arena, in light of competing economic, security, and other interests. Thus, this dissertation focuses on the domestic

implementation of export controls, or countries' export licensing decisions whether to allow the export of a certain controlled technology.

Export controls variously concern *goods, technologies, or items*. Although one can make a technical distinction between these terms (particularly goods, which are generally tangible, and technologies, which are intangible), I generally use them interchangeably, as fits the context of the discussion. The export of any item on a country's control list requires authorization, or an export *license*.

In the following section I provide an overview of the purpose of export controls.

1.6 PRIMER ON THE PURPOSE(S) OF STRATEGIC EXPORT CONTROLS

While prevention of the proliferation of WMD, including chemical, radiological, biological, and nuclear material is the primary stated objective of export control practices today, this was not always the case. States have historically practiced restrictions on exports for various reasons, from as early as the Byzantine period, according to Fuhrmann (2008, 435). The modern form of multilateral and national-level export controls has its roots in the Cold War, when the primary purpose of controls was to prevent advanced Western technology from flowing to the Soviet bloc countries through the Committee for Multilateral Export Controls (CoCom).

With the end of the Cold War the focuses of export controls have shifted away from anticommunism toward nonproliferation objectives and rogue states or non-state actors. Causes include Saddam Hussein's use of chemical weapons use in the 1990s, the terrorist attacks of September 11, 2001, the revelations of Iranian nuclear facilities in 2002 and the A.Q. Khan nuclear

proliferation network in 2004,⁶ and North Korea's first successful nuclear test in 2006. The targets of control have also shifted, from tangible to intangible technologies and from physical shipments to other types of transfer, including Internet communication and illicit financing.

Four multilateral export control regimes help manage the flow of sensitive technologies in the post-Cold War era. Concerned producer states established these regimes during the late Cold War or soon after, each in reaction to a different stimulus. The regimes have slightly different memberships as well. The first was the Nuclear Suppliers Group (1975), created in response to India's nuclear test. The second was the Australia Group (1985), in response to chemical weapons use in the Iran-Iraq War. The third, the Missile Technology Control Regime (1987) to limit the spread of unmanned nuclear and later WMD Delivery systems. The fourth was the Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-Use Goods and Technologies (1996).

Of the four regimes, WA has always been the most controversial. It was the successor to CoCom, which the allies disbanded in 2004, and controls both dual-use goods and technologies and conventional arms.⁷ Its stated purpose is vague: "to contribute to regional and international security and stability, by promoting transparency and greater responsibility in transfers of conventional arms and dual-use goods and technologies, thus preventing destabilising accumulations" ("Guidelines-and-Procedures-Including-the-Initial-Elements.pdf" 2016). It is the

⁶ In Feb. 2004, Pakistani scientist Abdul Qadeer Khan confessed to having illicitly transferred nuclear weapons technology to Iran, Libya, North Korea, and other countries. The Pakistani government subsequently requested US and Japanese assistance in making new export control legislation.

⁷ The United States created CoCom together with its NATO allies to prevent the flow of advanced technologies to China, the Soviet Union and the other Warsaw Pact countries. Notably, while Russia became a member of Wassenaar after the end of the Cold War, China is still not a member; although it did join the Nuclear Suppliers Group in 2004.

result of a compromise between state representatives reluctant to revive CoCom—including the leaders of the United States.⁸

Moreover, WA includes Russia, once CoCom's target, but not China. (In fact, of the four regimes, China is only a member of the Nuclear Suppliers Group.) Each of the four regimes has a membership of approximately 40 countries (a low of 34 countries for the Missile Technology Control Regime and a high of 48 for the Nuclear Suppliers Group). It is non-treaty based, has no official monitoring or enforcement mechanisms, and operates by consensus, meaning that all member countries must agree to add or remove an item from the regime's multilateral control list. Each country is expected to reflect the multilateral export control lists in their respective national legislation.

Also, while not a focus of this dissertation, as a direct result of the 9/11 terrorist attacks and the later discovery of the A.Q. Khan nuclear proliferation ring, the United Nations passed UNSCR 1540 in 2004 by a unanimous vote. It requires all member countries to develop effective export control systems by 2021.

States build and amend the export control lists for the four multilateral export control regimes in annual meetings of their technical and expert groups. All forty-some members must unanimously agree before they can make an additions or removals. Otherwise, the proposals are shelved for another year's review. These changes then are reflected in each state's (or in the case of the European countries, the EU dual-use control list as well) control lists. Some states require further approval before items can be added. The changes in surveillance technology controls are one example. The EU and Japan adopted them without issue, but the United States still has not yet

⁸ See Cupitt, Richard T. *Reluctant Champions: U.S. Presidential Policy and Strategic Export Controls, Truman, Eisenhower, Bush and Clinton*. Routledge, 2002, for more.

implemented them. Because the regimes are voluntary and have no enforcement mechanisms, they are dissimilar to international law that must be incorporated into domestic law (in some countries with approval from the legislature).

One would expect challenges in informal multilateral organizations that touch on security, economic, and political issues without an obvious threat like the Soviet Union to coalesce around. Despite that, in recent years, these regimes have been quite successful in bringing states to control the same technologies—in other words, to include the same technologies on their national export control lists.

As a result of coordination both through the UN, but especially in the multilateral regimes, most states' national control lists are similar. Recognizing the expertise of the multilateral fora and also the importance of coordination on export controls, most states directly incorporate changes in the multilateral regime lists into their own national control lists, albeit with some important exceptions or differing levels of control.

Yet under the principle of national discretion, states are free to implement export controls as they wish, as well as to determine to which countries which exports they will control. Therein lies the rub: various factors such as foreign policy, geopolitical concerns, export dependence, and industry importance to the domestic economy could affect what actually gets approved to export and to whom.

The more dissimilar any two states, the more we could expect them to diverge in their export licensing decisions, despite maintaining controls on the same technologies. Both within and among states, government officials think differently about the importance of engagement versus containment or free trade versus protectionism. It is also possible that states use export controls as an excuse for protectionism, for example, to prevent technology leakage to an economic

competitor. States also vary on how they handle intangible technology transfer.⁹ Some states have additional controls such as student vetting. For example, the United States has a system of “deemed exports,” which is the transfer of information to a foreign national even within the United States. In contrast, Japan determines exports on the basis of whether the receiver is a *resident* of Japan, regardless of their nationality or citizenship.

In their export control decisions, while nonproliferation is an important concern, states take into account other factors, including risk of internal diversion (e.g., from civil to military use), onward diversion (e.g., reaching a third country destination), potential human rights abuse or repression, regional stability, foreign policy and international treaty commitments, and national security or the security of allies. How to control exports to terrorists and non-state actors is another concern. It is becoming harder to distinguish between military and non-military goods and production due to “technological convergence” (Cheung and Gill 2013, 444). States are increasingly concerned about the potential for human rights abuses with some of their high-tech exports, but the multilateral export control system was not designed to deal with such considerations.

The WA, in contrast to the other three export control regimes, has no “no-undercut” rule. In the other regimes that have a no-undercut rule, if a license is denied because a participating state decides its export is detrimental to national security or foreign policy, the denying country notifies the other regime members and others must consult with the denying country before approving an export of the same or similar items to the same end-user. The lack of a no-undercut rule on the

⁹ An “intangible” transfer or export of technology includes sending or transmitting technology from a country to another country via electronic (e-mail, fax) or oral (phone) means, or making it available for electronic access. The provision of “technical assistance” can also be a form of intangible technology transfer.

dual-use items Wassenaar controls means that states could vary fairly significantly in their implementation of controls. Given the lack of licensing data globally, states do not even have a way to become aware of this outcome aside from complaints from their exporters.

Meanwhile, several new complications in export controls are becoming troublesome. One is the ability of rising countries, especially in Asia, to produce controlled dual-use technologies. Their production could negate the effectiveness of controls, particularly if these countries are not regime members—and the vast majority are not. The principle of “foreign availability” is only a criteria for consideration in Wassenaar—in other regimes, the items are still controlled, even if they become available overseas. Thus, as non-regime members become able to produce more dual-use items on the Wassenaar list, we can expect participating states to press for de-control of these items.

1.7 CONTRIBUTIONS

My study on strategic export control practices makes several contributions. The first is to create a database and analyze dual-use trade data from three advanced exporters, which both academics and governments have recognized to be an important task (see, for example, “Export Controls: Observations on Selected Countries’ Systems and Proposed Treaties” 2010; Fuhrmann 2008; Versino and Cojazzi 2011). This data and analysis will contribute both to international trade theory and to policymaker awareness of the actual picture of international trade in sensitive goods.

The second contribution is theoretical, to augment the bureaucratic politics and foreign policy literature by applying insights from psychology and issue salience research to the foreign policy bureaucracy in multiple countries. I believe such an approach will allow us to move beyond

the “economics versus security” dichotomy prevalent in strategic export control discussions and incorporate a fuller range of possible foreign policy objectives.

The third contribution is to export control policymaking. By offering an in-depth study of how states implement their dual-use export policies, I offer insight into how states pursue their interests—security, economic, and otherwise—in the post–Cold War period. If bureaucratic politics and issue salience are major determinants of export control policy, knowing how and why certain technologies touch on policy issues can explain otherwise seemingly inconsistent patterns in dual-use exports to countries of concern. Findings from my project will help governments negotiate multilateral export control policies more effectively and implement controls more uniformly, essential tasks in managing the spread of security risks and WMD.

My final contribution is to augment the study of Japan’s export control implementation, of which there are few recent studies, particularly in English. Japan is the only original non-Western member of the multilateral export control regimes, and it has a unique model of government-industry relations. For example, it is the only major advanced country whose defense agency is not officially involved in the export control decision-making or licensing process. Few in-depth studies published in English of Japan’s strategic export controls in the post–Cold War era exist, so my work contributes to greater Western knowledge of Japan’s contemporary strategic and security policies.

1.8 DISSERTATION ROADMAP

This chapter offered an introduction to the dilemma of dual-use export controls, my research questions, and an overview of my theoretical approach. The next chapter (Chapter 2) offers a fuller description of the relevant theoretical literature, hypotheses based on these, and my research

methodology. Chapter 3 provides background on the export control systems of the three exporting countries and the five dual-use technologies I cover in my analysis, providing identifications for my bureaucratic and salience variables. Chapter 4 is the empirical chapter that applies quantitative analysis to the exports of the five technologies, to allow for hypothesis testing. Finally, in Chapter 5, I conclude my work by reviewing my overall findings, their policy implications, and future tasks for researchers in this field.

Chapter 2. EXPORT CONTROLS, THEORY AND METHODS

“From the U.S. perspective, China is the poster child for the double-edged nature of the globalization of technology.” – Adam Segal (2007)

This chapter begins by reviewing the existing, related theoretical literature on strategic export controls. It also covers existing empirical studies of export controls before proceeding to this study’s research design. I advance my argument for why we see divergence in dual-use exports and develop testable hypotheses based on my discussion of the existing research.

2.1 THEORETICAL LITERATURE

In this section I discuss existing approaches to international relations to assess how they would address the puzzle of variance in dual-use export control implementation among similar countries. The first two competing explanations derive from realism and liberalism, and roughly correspond to the “security” versus “economics” perspectives of export controls. I draw implications for export controls from these approaches both across states and across different technologies. I then present the theoretical background for a bureaucratic politics explanation that offers a more nuanced take on the variation between states on export controls.

Finally, I present the concept of “issue salience” based on a psychological approach to policymaking, and discuss how this could help us understand not only differences between states on export controls but also differences within states on various technologies. Bureaucratic politics and salience-focused explanations make predictions that sometimes diverge from both the realist and liberal expectations.

The first two possible explanations for why we see divergence among similar states in their implementation of dual-use export controls come from well-established approaches in the international relations field, realism and liberalism. These two approaches map nicely onto the standard description of export controls as being a matter of security versus economics. Both explanations generally treat the state as the primary actor and assume state policy is rational and reflects state interests.

2.1.1 Standard International Relations Approaches

2.1.1.1 Realist Approaches

Neorealism, as developed by Kenneth Waltz, treats states as unitary actors. It builds on a history of realism that focuses on the narrowly-defined security of states. In the neorealist's view, external forces (the international system) are the primary motivators of state behavior, rather than domestic interests. The survival of the state (security) takes precedence over other objectives, even if ensuring security sometimes incurs economic loss.

In this view, if decision-makers must choose between economics and security, security should win out. Further, relative gains over other states matter more than absolute gains. Given the competitive nature of international relations, states are unlikely to cooperate except when it benefits them directly. States are also concerned about cheating even when cooperative arrangements, which include multilateral export control regimes, do exist (Mearsheimer 1994).

Meanwhile, a related school of thought, mercantilism, believes in the zero-sum nature of competition between states. Due to its concern with relative gains, it aims to protect domestic economies from foreign competitors. A mercantilist approach sees a major producer country's export of high-tech goods to a rival country as diminishing the former's competitive economic and

military advantage. Meijer (2016) calls this group “control hawks” in his study of U.S. export control policy toward China. They believe that protecting American technology by avoiding trade with a country of concern is the most appropriate way to pursue US interests.

In the field of export controls, realists and mercantilists would expect countries to restrict sensitive items to destinations they have identified as adversaries, rivals, or potential adversaries. The greater the actual or potential security threat a state perceives from an importer, the less likely it should be to export a sensitive or militarily relevant item (*Hypothesis 1*).¹⁰ The concern of realists is to avoid making a military contribution to a current or potential adversary. At a technology-focused level, a corollary to this argument is that the greater the military threat a particular dual-use technology poses, the less likely a country will export it to a country of concern (*Hypothesis 2*).

2.1.1.2 Liberal Approaches

Liberal approaches to international relations, in contrast to neorealism, ascribe importance to economic relationships in foreign and security policy, and generally see the potential for economic relationships to mitigate conflict. Neoliberalism, as first fully articulated by Keohane’s *After Hegemony*, emphasizes the institutions and economic relations between interdependent states in the age of globalization.

Neoliberalism believes these ties help to prevent conflict. In contrast to neorealism’s zero-sum approach, neoliberalism believes in the possibility of a positive-sum outcome because

¹⁰ I focus on perceived threat because I do not believe it is possible to objectively assess how much of a threat one country poses to another, but rather, how decision-makers perceive intentions and capabilities of others matters. As Stein asserts, “Threats do not unambiguously speak for themselves. Understanding the meaning of threats is mediated by the perception of the target” (2013).

absolute gains matter. It values institutions for their ability to help states break free of the Prisoner's Dilemma.

From this theoretical perspective, the point of multilateral export control regimes is to help states achieve the best outcome given their mutual security interests and competing economic incentives. If states have shared interests in nonproliferation and the other objectives of export controls, they should be able to use multilateral institutions to realize these objectives. In contrast, a neorealist would suggest that states follow regime rules only when they are convenient and ignore them when they are not. In the neoliberal's view, a failure to cooperate or coordinate on export controls is attributable to the regime rules or incentives not being properly specified. In contrast, the neorealist does not believe cooperation is sustainable to begin with.

Neoliberalism can explain why states come together in multilateral export control regimes given their shared interests in international security and nonproliferation (or, during the Cold War, containment). A neoliberal analysis of export control policy could assess how well the multilateral export control regimes function as institutions and whether they are properly structured in a way to ensure cooperation among member states. An analysis could also assess differences between regime members and non-members in terms of their export control policies and decision-making.

A test of neoliberal versus neorealist explanations could assess how much states actually cooperate versus defect in their domestic implementation of controls. Yet given that this study seeks a state-level explanation for variance in implementation among similar states who are already regime members, I instead focus on a liberal approach to state and domestic economic interests, rather than looking at institutions (the export control regimes) directly.

Pluralism, in the vein of Locke's "Second Treatise of Government," developed as part of the liberal tradition. It sees politics and policy as a result of multiple competing interests within a

state. Policy requires compromise, so it is impossible to treat policy as a rational outcome. Such a statement is obvious to those who study domestic politics, but the assumption of a unitary and rational state is often a sacrifice international relations scholars make for the sake of parsimony—to avoid a “confusing proliferation of domestic variables to explain a systemic outcome” (Milner 2009, 4).

Some scholars emphasize the interaction between the domestic and the international levels, particularly Putnam with his concept of “two-level games” (1988). While neoliberalism focuses mainly on incorporating the role of NGO-type actors in a state-centric framework, pluralist approaches attempt to include a range of other non-state actors, including domestic interest groups, and assess the impact they have on policy.

A liberal, economics-focused approach can address how a country’s or industry’s export dependence could affect the level of controlled exports, which realist approaches overlook in their emphasis on national security. Governments are interested in supporting their companies’ exports to gain profit, employment, and tax revenue (Smith and Garcia-Alonso 2006, 34), and these objectives might outweigh security concerns.

The more trade-dependent a state, the more likely it is to focus on economic gain via exports, as was the case during the Cold War, when “U.S. officials complained that West European CoCom delegations were heavily weighted in favor of trade interests, to the point of having industry representatives seated at the negotiating table” (Mastanduno 1992, 275). As Mastanduno notes: “The degree of trade dependence is significant because the use of export controls involves economic costs for the sanctioning state. The potential political or strategic benefits of trade controls must be weighed against the economic costs of applying them” (1992, 58). Thus, it is reasonable to expect that the more trade-dependent a state is, the more likely it will be to export a

dual-use technology, even if the export is to a country of concern (*Hypothesis 3*). I file Hypothesis 3 under a liberal hypothesis for because it focuses on absolute economic gain for a state rather than national security, although realists including Mastanduno can agree with the basic proposition that trade dependence matters to how a state conducts its trade policy.

I also test the impact of domestic industry interests in the export control process using liberal, pluralist insights into domestic processes. Most of the liberal literature focuses on why certain industries prefer protectionism and others prefer liberalization (particularly with regards to imports), and how these preferences influence trade policy. My study takes a different tack as I am interested in the exporting industries that push for the ability to export their goods. Yet the mechanisms by which domestic industries influence policy are the same.

As Milner (1987) describes in her article on US and French industrial trade preferences, companies can lobby the legislature or work through trade representatives, industry trade associations or, in the case of France, appeal to a variety of government ministries. Through such mechanisms, she finds that the firms in her study are able to shape state policy in a way that reflects their preferences.

Building on these findings, I suggest that the more important a given exporting industry is to the domestic economy, the greater the number of controlled exports we should see, even to countries of concern (*Hypothesis 4*). The logic behind such an argument is that more economically hefty industries, such as those dealing in surveillance technologies in the United States, or carbon fiber manufacturers in Japan or Germany, will have a greater ability to pressure the government to allow exports of the items it produces.

Even if an industry does not engage in interest group politics to pressure the government for the liberalization of exports, the economic agency may nonetheless be concerned about the

international competitiveness of its major domestic industries and try to ease exports for them. Their position derives from the economic agency's mission to support domestic industry, which means not over-controlling exports from domestically-significant industries.

2.1.2 Bureaucratic Politics

While the preceding approaches have focused on state interests in the aggregate, a bureaucratic politics approach looks inside the state to understand how the structure of the government affects policy outcomes. Thus, it does not make directly opposing predictions in the way that neorealism, with its focus on security and relative gains, does against neoliberalism with its focus on economics and absolute gains. Rather, a bureaucratic politics approach can help explain outcomes that may be puzzling from a rationalist perspective that expects the state to make policy decisions as a unitary actor.

Often, "bureaucratic politics" carries a negative connotation, and scholars use this approach to explain suboptimal outcomes, but I do not take such a normative stance. Generally, researchers have used bureaucratic politics theories to explain the functioning of one state's internal politics (especially the United States), but have not often applied these theories to trans-national or trans-cultural situations, as I do here.

I offer a background of the key elements of the bureaucratic politics literature that are relevant to my study to derive a hypothesis on how defense agency involvement in the export control process might help to explain outcomes more effectively than realist or liberal approaches. Indeed, a bureaucratic politics perspective can help us understand how states resolve the tension they experience between the realist and the liberal—or the security and the economic—aspects inherent in export control policy. In so doing, I further develop the assertion that, "The various

objectives of the government may or may not conflict in particular cases, and where objectives do conflict, they often appear as conflicts between the government departments responsible for export control” (Smith and Garcia-Alonso 2006, 34).

Bureaucratic politics studies vary more in their research topics and treatments than do the realist and liberal approaches to international relations. Rather than focusing on either the state or individuals as actors, Allison put forth a model that suggests researchers treat domestic organizations as policy actors. In particular, export control licensing may fit well into Allison’s Model II or the “organizational process model,” which he develops in his book *Essence of Decision: Explaining the Cuban Missile Crisis* (1971). Jones notes that the organizational process model “may be particularly appropriate for capturing low-salience decision making,” where bureaucrats, not high-level officials, make the decisions in routine or technical policy areas (C. M. Jones 2010).

One important concept from this body of research is “organizational essence,” which, in their revised edition of the classic *Bureaucracy and Foreign Policy*, Halperin & Clapp continue to define as “the view held by the dominant group within the organization of what its missions and capabilities should be” (Halperin, Clapp, and Kanter 2006, 27).¹¹ Each of the organizations that participate in the dual-use export policymaking process—namely, the defense, foreign affairs, and economic agencies—have a distinct “organizational essence.” Moreover, civil bureaucrats are the ones making dual-use policy decisions, and are likely have a clear sense of their organizational essence. They generally have leeway to make decisions on most dual-use exports, except when the

¹¹ I use the term “organizational essence” following Halperin & Clapp, but take it to reflect in practice an agency’s mission. The term “essence” implies a mission being filtered through the dominant group’s interpretation of mission, but for my purposes, this distinction is not important.

legislature, an NGO—or rarely, the state leader—chooses to focus on promoting or restricting a particular technology export.

Halperin & Clapp suggest career officials often make decisions through a process called “grooved thinking.” In other words, responses tend to follow a pattern based on their organizational interests (2006, 27). Grooved thinking is particularly applicable when it comes to mundane tasks handled by low-level bureaucrats (Mintz and DeRouen 2010, 73). The concept of organizational essence combined with grooved thinking suggests that bureaucrats working on export controls are likely to eschew decisions that would go against their mandates, which could be protecting the homeland or trade promotion, etc.

Thus, bureaucrats tend to follow a given policy trajectory in their day-to-day decision-making based on their organizational essence that varies little over time. Interagency debate over specific licensing decisions is unlikely to affect their basic ways of thinking.

Jones (1999) compellingly shows that a bureaucratic politics analysis of the Defense, Commerce, and State Departments can explain the United States’ “dangerous export policy” in the lead-up to the first Persian Gulf War, which involved exporting of dual-use products that contributed to conventional arsenal and WMD development in Iraq. He finds that “The three agencies’ policy positions were based unequivocally on their distinct bureaucratic roles. The organizational mission and essence of each created different conceptions of national security and therefore different reasons in favor of or against export controls.” He also asserts that “the behavior of the relevant institutions was remarkably consistent over time” (1999, 269–70).

While not often applied to trans-national or trans-cultural situations, some evidence also suggests that a bureaucratic politics approach can help explain foreign policy in foreign

governments (Jager et al. 2009).¹² In my study, the variation in bureaucratic involvement in export control policymaking in the United States, Japan, and the UK allows me to assess the impact of bureaucratic interests or organizational essence in export control practices relative to other factors.

To extract the organizational essence of each bureaucratic organization, I rely on interviews, as “Career officials generally have a clear notion of what the essence of their organization is or should be” (Halperin, Clapp, and Kanter 2006, 27). I generally confirm that Jones’ identification of the defense agencies to be the most security-focused and therefore the least willing to export sensitive technologies to countries of concern; and the economic agency the most economy-focused and therefore the most willing to export.¹³

Indeed, at least prior to the Persian Gulf War, “In case after case, the Defense Department warned that export licenses for advanced, dual-use products should be denied due to the likelihood of military end-use. The Pentagon’s objections were repeatedly challenged by the Commerce Department, which enjoyed the support of the State Department” (C. Jones 1999, 269).

While bureaucratic politics approaches do not make *a priori* predictions about the role of various bureaucratic agencies in foreign policy, in the field of export controls the economic agencies and the defense agencies involved in export control decision-making have competing

¹² See, for example, Nossal, K.R., “Allison through the (Ottawa) Looking Glass: Bureaucratic Politics and Foreign Policy in a Parliamentary System,” *Canadian Public Administration* 22 (1979), 610–26; which argues that the bureaucratic politics model is also applicable to parliamentary systems (Canada). Also, see Tayfur, F.M., and Goymen, K., “Decision Making in Turkish Foreign Policy: The Caspian Oil Pipeline Issue,” *Middle Eastern Studies* 38 (2002), 101–22; and Jager, T., K. Oppermann, A. Hose, and H. Viehrig, “The Salience of Foreign Affairs Issues in the German Bundestag,” *Parliamentary Affairs* 62, no. 3 (2009): 418–37.

¹³ Some of my interviews suggested the Department of Defense is moving toward a more flexible understanding of national security which better perceives the value of trade promotion, not only trade restriction, to support the domestic defense industrial base and the co-production of military items with allies. Also some special cases exist, such as with encryption technologies, where the National Security Agency would prefer to export U.S. commercial encryption as long as it has the keys (author email with U.S. government researcher, 24 May 2013).

missions—export promotion and national security, respectively.¹⁴ Miles' law of "where you stand depends on where you sit" implies that bureaucrats will tend to make decisions in terms of the organizational essence of the agency to which they belong.

Depending on whether the economic or defense agency has more or less input into the export decision-making process legally and in practice, a bureaucratic politics proponent would expect to see less or more restriction on exports, respectively. Given that in all of my countries, the economic agency is ultimately responsible for licensing dual-use exports, a bureaucratic politics perspective would expect that the greater the defense agency involvement in the export control process, the fewer controlled exports we should see to a country of concern (*Hypothesis 5*). I identify to what degree the defense agency has input into export control policy in Chapter 3.

The bureaucratic politics approach offers an additional level of sub-national detail for analyzing how states resolve the pull between economics and security. Yet the economic and defense agencies are not the only players in the export control process. The foreign affairs agency is a third player in the United States, the UK, and Japan. For example, Jones characterizes the State Department as having a "diplomatic conception of national security. In its view, technology sales facilitated good relations with Iraq and promoted U.S. foreign-policy interests" (1999, 279). The definition of a "diplomatic conception of security" must depend on the context, including the time period and partner, and therefore requires further investigation.

Moreover, as Allison & Halperin suggest, "Players choose in terms of no consistent set of strategic objectives, but rather according to various conceptions of national security, organizational, domestic, and personal interests" (1972, 43). If strategic objectives are not relevant,

¹⁴ Mastanduno's work on CoCom provides evidence for this in the case of the United States (1992); for Britain, see Mastanduno and Bertsch (1988).

then a static interpretation of organizational essence where the defense agency, for example, always wants to restrict exports may be insufficient to understand how countries actually make decisions about whether to export sensitive technologies to countries of concern.

Thus, I conclude my theoretical discussion by introducing an “issue salience” perspective. It helps clarify why bureaucrats make decisions on certain technologies that are puzzling from a simple “economics versus security” perspective, or a view based solely on a static organizational essence.

2.1.3 Bureaucratic Politics and Psychology (Salience)

While adding a political psychology or “salience” perspective may detract from parsimony in explaining export control outcomes, I believe it is a necessary addition. While organizational essence stays fairly stable over time, salient issues for each bureaucracy may change rather quickly (such as the salience of terrorism after 9/11). Also, the standard organizational essence argument does not offer much insight into what position the foreign affairs agencies would take on dual-use exports, since the goals of foreign policy changes over time in response to the international environment or with administration changes.

An issue salience perspective would allow for bureaucracies to focus on some issues more than others over time. Major policy goals at the national level, including economic competitiveness, the protection of human rights, and preventing the proliferation of WMD, change with external events and administration changes. Shocks to the system can rapidly enhance or diminish the salience of particular policy goals. These goals, which can be vague concepts or ideals, determine salience for bureaucrats. Salient issues do not necessarily fall neatly into bureaucratic categories. I further believe that certain technologies invoke salient concerns more

than others. I therefore turn to the concept of issue salience to form my final hypothesis for explaining variance in dual-use exports among similar countries.

The theoretical benefit of using a psychologically informed approach to international relations, or trade policy specifically, is that it allows a way to look at the interplay between the domestic and international levels through human perception and behavior. Indeed, as Steinbruner notes, “When we speak of such things as organizational process, political bargaining, and rational calculation, we tacitly know that in the final analysis the phenomena involved are based upon human mental operations” (2002, 91). As Snyder (1958) argued in his work on foreign policy decision-making, a psychological perspective must be embedded within the institutional or decision-making context (see also Rosati and Miller 2010), which in the case of export controls, comprises the government agencies implementing export control policy.

Political psychology covers a broad range of topics. Its modern origins are in Jervis’ work on Cold War–era perception and misperception (1976). The majority of scholars have used political psychology to explain mistakes, or decisions that go against rational expectations. Most studies center on the profiles of one or a small group of individuals. Group-focused psychological approaches have instead asked why people make bad decisions by investigating concepts such as “groupthink.”¹⁵

A smaller number of scholars, including Mercer (2005) and Gigerenzer (1991; 1996) have argued for the usefulness of psychology in understanding decision-making generally (not just to explain mistakes or biases), using concepts such as heuristics. Only a few works in the political

¹⁵ See, for example, Janis, Irving Lester. *Groupthink: Psychological Studies of Policy Decisions and Fiascoes*. Vol. 349. Houghton Mifflin Boston, 1982; and ‘t Hart, Paul. *Groupthink in Government: A Study of Small Groups and Policy Failure*. Swets & Zeitlinger Publishers, 1990.

psychology field are directly applicable to the study of how bureaucratic groups function, although business-oriented studies of organizational psychology may offer some additional insight into how groups function, if not their resulting policies. Yet for the study of export control decision-making, the study of “issue salience” appears particularly relevant.

In *Perception and Misperception*, Jervis notes that certain types of events are more salient in affecting how they later tend to perceive things. Event types include whether the person experienced the event firsthand, if the event occurred early in a person’s life, and if the event had important consequences for her or the country (1976, 239). From a prospect theory perspective, Mercer (2005) notes that the more visible or salient an event, the easier it is to recall, leading people to overestimate the frequency of such events.

As a narrower slice of the broad psychological concept of salience, issue salience “refers to the relative importance or significance that an actor ascribes to a given issue on the political agenda” (Oppermann and Viehrig 2011, citing Wlezien 2005; Soroka 2003). Scholars have extensively researched issue salience in domestic politics with regards to the general public and to political parties.

Oppermann & Viehrig see issue salience as the amount of attention actors devote to “the issue in question” and how important the issue is in decision-makers’ minds. In line with cognitive psychologists’ concept of humans as “cognitive misers,” issue salience is “a cognitive shortcut of human actors to select which information they process before deciding on a course of action” and a way of operationalizing Tversky & Kahneman’s “availability heuristic” (Oppermann and Viehrig 2011). As Tversky & Kahneman (1982) show, people tend to interpret the world based on whatever is top of mind for them. With issue salience in the foreign policy area, decision-makers focus on

some political issues at the expense of others. They will focus on those concerns that are their top priorities—those which are most salient to them. (Oppermann and Viehrig 2011, 4).

I expect bureaucrats in different countries to have different issues as top of mind depending on their countries' foreign policy priorities and their understanding of the domestic and international context in which they find themselves. Their understanding will then interact with their particular bureaucratic mission or organizational essence. Specifically, I envision a two-step process in which bureaucratic lenses first filter salient foreign policy concerns. These concerns become activated when an issue relevant to that concern *and* the bureaucratic mission arise.

For example, at the national level, I expect the United States, the UK, France, and Japan to perceive different types of threats from countries like China, Iran, and North Korea, and to think differently about issues like terrorism or human rights given their varied experiences and history. If terrorism is high on the minds of decision-makers, they will view dual-use exports in the context of their potential contribution to terrorism and the spread of WMD. If human rights play a more dominant role, we can expect decision-makers to consider licensing decisions on the basis of the human rights threat the export might pose. Again, a concern over terrorism or human rights is unlikely to be specific to one bureaucracy, but rather a concern of multiple arms of government.

Still, the different bureaucracies within the same country likely focus on different dimensions of the same issue in line with their bureaucratic essence. For example, assuming a national consensus on a "China threat," the US Commerce Department is likely more concerned about protecting American proprietary technology from being appropriated by Chinese companies, while the Department of Defense is more concerned about how the Chinese military could incorporate dual-use technologies into their own defense items.

Finally, while I think certain issues are more salient to people in one country versus another, I also suspect that only some technologies will touch on their salient concerns. For example, encryption technologies activate human rights concerns while machine tools are more associable with military concerns. To make my salience argument, I therefore focus on the technologies and whether they touch on salient issues for each country's bureaucracy. I locate evidence of the concerns a particular technology touches upon in policy documents, public records, media, and interviews to identify how different technologies generate different concerns, which I discuss in Chapter 3.

An issue-salience informed perspective acknowledges that neither all foreign policy concerns nor all dual-use technologies are equal. Rather, in my conception, a national or government-level perception of issue salience is filtered through the agencies working on export controls, which then affects decisions on the technologies that activates their salient concerns.

Such an approach contrasts with a realist or liberal approach in which states are able to make an objective and accurate assessment of the security risks or economic benefits of exporting a particular technology. Realist or liberal approaches often assume complete information, and that humans are free from cognitive or resource constraints on their ability to make the most appropriate decision to reflect their interests. Compared to the "rational baseline" for decision-making these theories provide, I believe decisions on export controls will reflect both organizational essence and issue salience, which are dependent on the country, time, and organizational structure of the particular government.

An issue salience explanation suggests that some technologies will tend to fall through the cracks while others will receive exaggerated scrutiny because bureaucrats are not all-knowing and must make decisions not only in line with their organizational essence but also because they are

affected by events and threats occurring in the external environment. Bureaucrats face limited resources in the export control implementation process, so they tend to fall into patterns of “grooved thinking” mentioned in the discussion of bureaucratic politics approaches. For practical reasons, decision-makers must focus on a limited number of concerns and ignore others where they do not know how to respond (see Halperin, Clapp, and Kanter 2006, 23).

Therefore, while some technologies may be more objectively threatening, bureaucrats may permit their export if they do not touch on a salient concern. Conversely, even if a technology poses only an ambiguous security threat, if it triggers a salient concern within the bureaucracy’s mandate, its export is more likely to be restricted. Focusing on which technologies attract more attention and for what reasons allows me to tackle the issue salience explanation.

My focus is not on how issue salience changes organizational essence, but rather how organizational essence, which is more inflexible, filters perceptions of issue salience. I believe for most salient issues, if we know enough about a bureaucracy’s organizational essence, we should be able to predict their positions. Of course the researcher must confirm these predictions must be confirmed through qualitative or quantitative data.

The preceding discussion leads to my final hypothesis—that the type of security threat of the technology matters to decisions to export. The salience argument does not stand on its own, but rather builds on the previous bureaucratic politics argument because certain concerns are more likely to be activated given the organizational essence of the actors engaged in the export control process, and their degree of engagement in the export control policy process.

In the example of Japan, as I discuss in Chapter 3, the defense agency is not involved in the export control process. Therefore, even if the government as a whole comes to see an importing country as a salient military threat, and even if certain technologies invoke military concerns, we

are unlikely to see restriction of militarily sensitive exports because the defense agency's mission to protect the national security of the country is not represented in the decision-making process. As Japan's defense agency participation increases in the future, however, we can expect increased restriction of militarily relevant technologies to countries that pose a salient military threat to Japan.

Thus, if a technology does not invoke a salient concern, or if it does but the relevant agency for that concern is not involved in the export control process, a country will be more likely to export the technology. But if a technology invokes a salient concern (e.g., terrorism or human rights), and the relevant agency for that concern is involved in the export control process, exports of that technology will be less likely (*Hypothesis 6*).

Hypothesis 6 contrasts with the realist Hypothesis 2, in which the greater the military threat a dual-use technology poses, the less likely it will be exported to a country of concern in all cases. One can view the realist hypothesis on the military threat of a technology as a special case of the salience hypothesis, because when military concerns are both activated *and* represented in the export control process, the salience hypothesis also expects restrictions on military-related technologies.

2.1.4 Export Control Research

In this section, I provide a brief overview of the existing research on export controls and discuss the theoretical approaches they have taken to the empirical topic of controlled exports. Using qualitative or quantitative approaches, the studies investigate the nature of export control systems or the implementation of export controls. Taken together, they offer parameters and suggestions

for my own study. Yet the authors all confront the same data limitations, which I attempt to navigate in a novel way.

The classic work in the export control field is Mastanduno's book (1992) on the Coordinating Committee for Multilateral Export (CoCom), in which he details the trajectory of Western export control policy from the end of World War II until the early 1990s. Having taken a realist approach, his primary conclusion is that despite its power, the United States is not always able to get other states to cooperate with it in CoCom. Instead, if other states' interests diverged with that of the United States', the United States was not able to achieve cooperation on its preferred export control strategies.

Yet even if allies' interests converged with that of the United States, lack of leadership in CoCom, particularly stemming from a divided US executive branch, determined failure or success in achieving cooperation in CoCom. Mastanduno also points to the tension between the dominant trait of "economic liberalism" and the recessive trait of "economic nationalism" in US foreign policy (1992, 10).

Since he wrote this book, the Cold War ended and the allies dissolved CoCom. WA has since taken its place, and advanced countries strengthened and expanded other multilateral export control regimes. Some of the very members CoCom once targeted, most noticeably Russia, are now regime members. Yet despite these changes, the theoretical foundations of Mastanduno's study are still relevant to my study of export controls, even though my work does not focus on the regimes themselves.

Mastanduno aptly captures both the liberal and realist elements of export controls applied to countries of concern: "Given a commitment to use trade with an adversary as an instrument of statecraft, the choice of strategy is driven by economic, political, and strategic considerations.

Specifically, those factors likely to be most significant to a sanctioning government are the degree of its trade dependence on the target, its overall political orientation to the target government, and its military relationship with the target, including such elements as the probability of war and the nature of peacetime military competition” (1992, 57).

Other US-focused studies of export controls include Bertsch & Elliott-Gower (1992), which addresses the challenges of export controls in the waning days of the Cold War; and Cupitt’s book on the role of the President in the US export control system (2000). Comparative studies include edited volumes by Beck et al. (2003), which compares export control systems in the United States, Russia, China, France, and India and includes a quantitative element; Joyner (2006), which primarily focuses on the multilateral export control regimes; and Meier (2013) on issues in controlling dual-use technology transfers and how to improve regulations.

A recent US Government Accountability Office report (“Export Controls: Observations on Selected Countries’ Systems and Proposed Treaties” 2010) covers the export control systems of five US allies—Australia, Canada, France, Germany, Japan, and the UK. The primary motivation for this report was the increasing amount of defense cooperation and technology transfer from the United States to its allies, especially with proposed defense trade treaties with the UK and Australia (these were passed in June and September 2007, respectively).

More recent works on export controls in a quantitative vein include pieces by Fuhrmann (2008; 2009), Kroenig (2009), Jones & Karreth (2010), and Stinnett et. al (2011). Most recently, fall 2015 saw the publishing of a peer-reviewed journal on strategic trade controls, *Strategic Trade Review*. Below, I discuss only those studies from which I derive my methodology.

Fuhrmann (2008) investigates the determinants of dual-use trade and as such, his study is the most relevant to mine. He uses data on US aggregate, licensed dual-use exports from 1991–

2001. While acknowledging that his findings are preliminary, he presents evidence to support his hypotheses that states direct dual-use exports toward partners with whom they have security guarantees and away from security threats. A stronger finding, however, is that the US is more likely to export dual-use goods to other democracies than to non-democracies. That democracies are more likely to trade with each other is a well-established finding in the international relations literature.

While his hypotheses on security guarantees and trade to other democracies are not relevant to my study on exports to countries of concern, the way in which he addresses data limitations dual-use trade is, as are his suggestions for future research. Due to methodological considerations, he limits his focus to exports from the United States to the 128 countries that are neither its “strongest adversaries” nor its “closest allies” (Fuhrmann 2008, 640–41). He also looks at the overall volume of licensed dual-use trade and does not break it down by technology type. His “inconsistent findings” suggest that more work is needed to “determine whether other countries channel dual-use trade to the same degree as the United States” (Fuhrmann 2008, 649). Fuhrmann also cites Dorussen (2006, 87) in that “some goods should have a bigger impact on the likelihood of conflict than trade in others”—especially oil and high-tech trade, which are often controlled dual-use goods. By including other advanced exporters and also investigating specific dual-use technology exports rather than dual-use trade on the aggregate, I build on the work he started.

In another article, Fuhrmann takes a different tack and looks at why countries provide civilian nuclear assistance, which can be thought of as a special kind of dual-use export. He finds that rather than norms like nonproliferation, states provide civil nuclear assistance for strategic reasons—“to strengthen their allies and alliances, to strengthen their relationship with enemies of enemies, and to strengthen existing democracies and bilateral relationships with these countries (if

the supplier is also a democracy)” (2009, 181). Since I do not investigate a range of potential importers, but only one importer, his strategic considerations are not relevant to my study, but they could be if I include more importers in my future work on this topic.

Kroenig (2009) also asks what motivates states to provide sensitive nuclear assistance. He finds that while the degree of economic growth or development does not explain why a state transfers sensitive nuclear assistance, heightened trade dependence leads to an increased likelihood of transfer. While all of the exporters in my study are of equivalent economic development, their trade dependence varies. Trade dependence might matter to their willingness to export sensitive technologies, per the liberal argument. Yet Kroenig concludes based on his finding that poor economic performance does not lead to more sensitive nuclear assistance “that states are unlikely to pursue economic gains when the result undermines their own security” (2009, 127).

Whether one can draw this conclusion based on the economic growth or development variables not being significant in his quantitative analysis is doubtful, particularly when trade dependence (which he treats as a control variable) does appear to have a statistically significant impact on nuclear technology transfer. As far as his interpretation of what might undermine a state’s security, his variable for having a shared common enemy is not relevant to my study, but his variable for “disputes” is. Specifically, he finds that the more disputes between an exporter and a potential recipient, the less likely a country is to export sensitive nuclear technologies. This agrees with the realist hypothesis that the greater the security threat an exporter perceives from the importer, the less likely a state will be to export a sensitive or militarily relevant item.

Taking a different approach in a study for the US State Department, Jones & Karreth investigate whether the development of strategic trade controls in developing countries facilitates or inhibits trade. Their approach is to look at US Advanced Technology Product (ATP) exports,

many of which are likely controlled to some degree (S. Jones and Karreth 2010). Their concern is different from my own—namely, they aim to show that the adoption of export controls in countries developing strategic trade control systems does not negatively impact trade. Their use of ATP exports is novel, but as Jones & Karreth admit, only a fraction of ATP exports are actually controlled (2010, 23–24). In my study I prefer to focus on specific exports very likely to be controlled than an aggregate measure of advanced technology trade that includes many uncontrolled items, even though it means significantly less trade data available to analyze.

Finally, Stinnett et al. (2011) investigate why states take active steps to control exports of dual-use technology. In particular, they focus on why states comply with international obligations (UNSCR 1540) to limit WMD proliferation. They look at dual-use trade vis-à-vis 30 states' nonproliferation interests and find that state capacity (technical and bureaucratic) better explains the lack of adherence to multilateral export control regimes than states' interests (as measured by security ties, economic interests, and external pressure). This finding is relevant to my case selection of exporters, as I either have to control for state capacity or ensure that all of the exporters have similar levels of state capacity. I take the latter approach.

Before presenting my research design and reiterating the hypotheses I derive from the preceding theoretical discussion, I discuss political economy perspectives to trade and exports. My objective in doing so is to identify a gap in the literature that a study of dual-use exports will help fill.

2.1.5 International Political Economy Perspectives

In contrast to the theoretical approaches I have already covered, the field of International Political Economy (IPE) focuses on issue areas such as international trade and comparative advantage,

globalization, international finance, international economic institutions, development, and multinational corporations. The international trade literature is massive, and for the purposes of my dissertation, relevant categories can be divided into three areas—research on the relationship between trade and conflict, on the arms trade, and on disaggregating types of trade. I draw on these studies to emphasize the importance of studying dual-use trade, particularly exports to countries that may pose a security threat.

2.1.5.1 Trade and Conflict

Traditionally, scholars—mostly of a liberal streak—have looked at the impact of trade and its potential to mitigate conflict. The most robust findings are that democracies tend to trade with other democracies and that state dyads in conflict, or likely to be in conflict, are less likely to trade. Oneal and Russett have been among the strongest proponents that interdependence (bilateral trade) reduces conflict (militarized interstate dispute) (see, for example, Oneal et al. 1996).

Some, especially those in the realist vein such as Keshk, Pollins & Reuveny (2004), have looked at the impact of conflict on trade. They question liberal arguments as they find that conflict inhibits trade while interdependence does not reduce the likelihood of conflict. Kastner finds that trade generally “follows the flag,” meaning that states trade less with states in which it is in conflict. Yet when internationalist economic interests are politically strong, trade can still develop among conflicting states (Kastner 2007).

Still others find that political tensions do not reduce trade or investment flows as might be expected (Davis and Meunier 2011). As Ward & Hoff put it, “there is no consensus on the linkage between conflict and commerce, either in terms of theoretical expectations or in terms of empirical findings: prominent published studies have concluded that bilateral international conflict either

stimulates, attenuates, or has no direct effect on bilateral international commerce” (Ward and Hoff 2007).

One reason for the confusion on the relationship between conflict and trade is that this literature rarely disaggregates trade flows by commodity type. Looking at causes and outcomes of trade without disaggregating by what type of item is being traded likely leads to the indeterminate or disagreeing results of the various studies on the topic of trade and conflict. The literature also uses a range of specifications, including for conflict, which makes findings difficult to compare. By disaggregating trade down to the dual-use technology level and limiting the type of “conflict” to that with one importer, this study attempts to bring some more clarity into a murky field.

2.1.5.2 Arms Trade

The existing work on the arms trade is primarily econometric and formal. Important findings regarding the political determinants of the arms trade include that democracies and allies are more likely to be recipients of arms, and that in the post–Cold War period, human rights practices sometimes matter to whether a country receives arms (Blanton 2000). As for the economic determinants of the arms trade, political and security concerns are the primary drivers of government support for industry. Government subsidies resulted in the formation of economic lobbies for the arms trade, according to Smith, Humm & Fontanel (1985).

As Garcia-Alonso & Levine note, arms exports present a negative security externality for the exporter country and other countries, “although exports to allies may have positive externalities” (2007, 953). They also suggest that the issues of cooperation and coordination among supplier countries are similar to the issues with CO₂ emissions, but “The added difficulty in the arms exports market is that these strategic interactions between exporters happen not only at the security level but also at the purely market competition level” (2007, 953).

The international coordination, security, and market competition aspects of the arms trade are also evident in the dual-use exports market. In fact, market competition is likely an even stronger element in dual-use trade given the tremendous number of companies producing dual-use goods compared to the more limited sum of arms producers. Because the arms trade was not profitable for the country as a whole even during the Cold War period—an era of major military buildup—the economic determinants of arms exports were actually political ones.

Dual-use exports also do not have the same “foreign policy” implications as arms exports, since they are primarily commercial transactions with little government involvement besides approval for export. Yet both types of trade share the capacity to undermine political or strategic objectives, meaning the supplier-side dilemma in arms and multilateral export controls are similar. Furthermore, technological advances and the downsizing of arms industries have led to greater commercial production of military-related technologies, making the trade in dual-use items increasingly important relative to the arms trade. Despite their increased significance, there are still very few studies on dual-use exports compared to the number of studies on arms exports.

2.1.5.3 Importance of Disaggregating Trade

Only a few studies of the supply-side determinants of the trade in dual-use goods exist. Reuveny & Kang (1998) point out that the IPE literature has often stressed the importance of studying disaggregated trade. The studies that do disaggregate trade find that trade in certain materials like energy and high-tech industries increases conflict (Goenner 2010; Dorussen 2006). In particular, the impact of trade in “strategic” goods likely has a different impact on conflict than the trade in non-strategic goods. Reuveny & Kang (1998) note that the factors that drive trade in “strategic goods” are likely different from those that drive commodities, although there is no established

definition of what is strategic. Schelling (1958) questioned the very distinction between strategic and non-strategic goods.¹⁶

Reuveny & Kang assert that studying trade in strategic goods is important, however, because “it is possible that such goods will be more responsive to politics because traders may attempt to limit or encourage their flow in conflictual or cooperative situations,” but also that “Quantitative empirical investigations dealing with strategic goods are indeed limited in scope and in number” (1998, 587). Fuhrmann (2008) is one of the few people to tackle the strategic goods issue by focusing on dual-use trade, making his the most relevant study to my research.

The existing work in IPE suggests that that economic, military, or political conflict should have a greater effect on trade in some types of goods than others, as was the case with CoCom restrictions on sensitive technologies during the Cold War. Thus we need a study that disaggregates types of trade.

While coming to an agreement on which goods are actually “strategic” is challenging, multilaterally controlled dual-use goods represent items that are highly sensitive in most states’ opinion. The other challenge in disaggregating trade and focusing specifically on dual-use trade is that there is no database on dual-use trade, although databases do exist for arms and general trade. Therefore, in my study, I use a mixed-methods approach to identify and gather data on dual-use trade. By studying controlled dual-use trade with a focus on multiple exporters to even their “strongest adversaries,” and by breaking down the different types of dual-use trade, I build on and fill important gaps in the existing literature.

¹⁶ The United States banned the export of crude oil from the 1970s because it was a strategic, short-supply good. The Department of Commerce had to approve any licenses for export, and this made up a huge portion of the value of total controlled trade until de-control took effect this year (2016).

2.2 RESEARCH DESIGN

From the comparative perspective, a major issue in the area of dual-use technologies is that while individual countries may have a grasp on how many licensed dual-use goods they are exporting, they know very little about what and how much other countries export. For reasons discussed in the Introduction, this is concerning because if similar producers are making different decisions on the exports of sensitive technologies, the countries restricting exports forgo not only economic gains but also security benefits. Here I present my research design, which allows us to compare not only how many controlled dual-use items countries export, but for what reasons.

The first research question driving this study asks: Do similar states practice export controls on the same technologies in a similar fashion? I address this question through my interviews with experts and government officials on three continents as well as quantitative data I collect on the dual-use exports of certain technologies. As I find evidence that similar states implement export controls differently on the same dual-use items, I then ask what explains variance in dual-use export control practices among similar countries in their exports to countries of concern.

While I suspect that an economic and security focus alone cannot explain actual export control decisions, I do not deny that economic and security considerations, as broadly conceived, are major factors in the export control process. The previous theoretical discussion of realist, liberal, bureaucratic politics, and salience approaches to export controls results in six empirically testable hypotheses for why we might see divergence in export control practices among states.

Looking across countries, the realist would assert that the greater the security threat the recipient country poses to the exporter, the less likely it will be for a state to export sensitive items to that country (Hypothesis 1). Looking across technologies, a realist would expect that the more

sensitive the item a company is trying to export is, the less likely a country is to license its export to a country of concern (Hypothesis 2).

A liberal, in contrast, would argue that across countries, the greater a country' total export dependence, or export dependence on the importing state, the more likely it will be for a state to export sensitive items, regardless of whether the recipient poses a security threat (Hypothesis 3). Across technologies, a liberal would expect that the greater the importance of the producing industry to the domestic economy, the more likely the country is to export the sensitive items that industry produces (Hypothesis 4).

Following Jones (1999), a bureaucratic politics theorist would assert that the greater a country's defense agency involvement in the export control process, the less likely it will be that country will export sensitive technologies to a country of concern (Hypothesis 5). Defense agency involvement in the export control process does not vary across the countries in my sample.

Finally—apropos the discussion on issue salience—while bureaucratic involvement in export controls does not vary at the sub-national level, concerns specific technologies raise in the minds of bureaucrats may. In addition to being more wary of some export destinations than others, bureaucrats may more closely review the exports of specific technologies, making the exports of these some technologies more sensitive to changes in the security environment. For example, the UK has the foreign affairs agency, which represents human rights interests, as a participant in its export control process.

Many Western states have linked encryption exports to human rights abuses, and so encryption export license applications could pose a major flag in the UK. The necessary conditions of both human rights salience and agency involvement are fulfilled in the case of human rights in the UK, meaning the UK should tightly control encryption exports. The situation in the UK

contrasts with Japan, where human rights are not a major consideration. Nor is the foreign affairs agency very involved in its export control process.

Hypothesis 6 expects that if a technology invokes a salient concern (e.g., terrorism or human rights), and the relevant agency for that concern is involved in the export control process, exports of that technology will be less likely. Conversely, if a technology does not invoke a salient concern, or if it does but the relevant agency for that concern is not involved in the export control process, a country will proceed to export the technology.

I provide further evidence for the bureaucratic and technology distinctions in Chapter 3. Below I provide a summary of my six hypotheses. Table 2.1 shows the type of hypothesis based on the theoretical literature it derives from, and clarifies the explanatory variable of interest. My dependent variable is the amount of controlled trade to China, so I also identify the hypothesized direction (negative, positive) of the independent variables' effect on controlled trade. I also identify which dimensions each variable varies on, which could be exporting country, time, technology, or some combination of these. I also summarize how I operationalize each independent variable, which I discuss in more detail in the following section and then for my quantitative analysis in Chapter 4.

2.2.1 Hypotheses

Table 2.1 Overview of Hypotheses

	Type	Independent variable (IV)	Increases on IV - effect on controlled trade?	Varies by	Operationalization
Hypothesis 1	Realist	Perceived security threat	Negative	Exporter, time	Mention of importer in gov't papers, military expenditure or assume increasing over time
Hypothesis 2	Realist	Security threat of technology	Negative	Technology	Total threat or traditional military threat of technology (derived from ECN)
Hypothesis 3	Liberal	Trade dependence	Positive	Exporter, time	Trade dependence on importer or exporter's total trade dependence
Hypothesis 4	Liberal	Importance of industry	Positive	Exporter, time, technology	Industry exports/all exports
Hypothesis 5	Bureaucratic Politics	Defense agency involvement	Negative	Country	Qualitative assessment of low to high involvement
Hypothesis 6	Saliency	Security threat type	Conditional	Technology	Type of security threat of technology (derived from ECN)

I can operationalize the six hypotheses in several different ways. I collect data for my key independent variables as follows:

Hypothesis 1 (Realist): Assess the exporter's perceived security threat by evaluating if and how the exporter's government papers describe the importing country as a threat. Or, focus on a more "objective" measure of security threat over time by measuring the importer's military expenditure or military expenditure to GDP ratio. Alternatively, for some importing countries, I may be able to assume that its perceived security threat is increasing over time.

Hypothesis 2 (Realist): Assess the security threat of technology using an *aggregate* measure of threat types (as reflected in the Export Control Number (ECN), which I detail in Chapter 3). Alternatively, only use the *traditional* military threat a technology poses (e.g., arms components poses a traditional military threat whereas surveillance technologies do not).

Hypothesis 3 (Liberal): Measure the trade dependence on the importer by dividing exports to the importer by total exports to the world. Alternatively, measure the exporter's total trade dependence by dividing total exports to the world by GDP.

Hypothesis 4 (Liberal): Measure the trade importance of the industry (which produces a controlled technology) to the domestic economy by dividing exports from that industry by exports from all industries.

Hypothesis 5 (Bureaucratic Politics): Assign a value from *low* to *high* for defense agency involvement in the exporter's export control policy process. For Hypothesis 5, I assume that the organizational essence of each agency is consistent with its mandate, namely that defense agencies emphasize national security while the economic agencies prioritize economic competitiveness and a robust domestic economy. Therefore, the important variation among exporting countries is in the extent of defense agency involvement, not the essence of the organizations, which I assume to be the same among similar advanced industrial democracies.¹⁷ In the next chapter, I provide background on the export control

¹⁷ Of course it is possible that organizational essence for the same agencies varies by country or within a country over time, but my selection of exporting countries and also the short time period my study covers minimize such differences.

structure of each of the exporters in my study and assign values of “low,” “medium,” or “high” to defense agency involvement based on this background.

Hypothesis 6 (Salience): I identify issue salience at the country level, the agencies involved in the export control process, and the type of security threat of technology (human rights, traditional military, proliferation, etc.). Identifying salience is the most difficult task, and to do this I have to rely on qualitative materials. Since I am concerned with the interaction between salient issues at a country level, organizational essence at an agency level, and the threat specific technologies pose, I approach issue salience via each of my technology cases to understand in what contexts they have been discussed. I also assess if the technologies touch on salient concerns that countries have raised and also whether agencies are tasked to monitor these concerns. Generally speaking, the salient concerns in modern-day export controls include human rights, nonproliferation, and national security. I further develop these topics of salience in my discussion of the reasons for dual-use export controls.

Other factors that existing studies suggest are significant are technology transfer agreements, changes in government, and legislative or bureaucratic reform. While some of these changes have occurred during the period I investigate in my study (1998–2014), I do not have enough data to effectively test the impact of these types of changes. Instead, I note them in the discussion of each of my technology cases in Chapter 3. In the future, I would like to incorporate them into my analysis to test, for example, how much the United States’ recent shifting of several categories of items from the munitions list to the Commerce Control List (CCL) affects the volume and destination of exports, or how much Japan’s Ministry of Defense increased involvement in the export control process will affect the export of militarily sensitive goods.

2.2.2 Case Selection

2.2.2.1 *Exporters – Advanced Industrial Democracies*

In this project, I focus on three of the world's largest dual-use technology exporters: the United States, the UK, and Japan. Their high volume of trade makes their policies and behaviors substantively interesting. The three countries are all members of all of the multilateral nonproliferation regimes and have some of the deepest security ties in the world, particularly via the US–Japan and US–UK alliances and NATO. They also produce similar types of technologies.

One might expect very different export control practices from countries such as Singapore or China, which are now also able to produce and export high-tech goods, but are not Wassenaar regime members and have different security interests than the Western countries and Japan. Thus, selecting the United States, the UK, and Japan presents a hard case for finding divergence in export controls, because we should expect their practices to be as similar as any three countries' could be.

Moreover, this selection of the United States, the UK, and Japan allows me to control for several important features while exploiting variation in others. In terms of similarities, the countries have similar levels of bureaucratic capacity and well-developed export control systems. Controlling for capacity is important because Stinnett et al. (2011) find that state capacity is a better predictor of state compliance than state interests.

Yet security concerns, as well as defense agency involvement, vary somewhat between the United States, the UK, and Japan, as does the number of agencies involved in the export control process. They also diverge in the relative importance of industries to their domestic economies. I exploit this variation to test my hypotheses, including to assess whether what Mastanduno contended over two decades still holds true: “In general, economic considerations have weighed

more heavily for Western Europe and Japan, whereas political and strategic factors have been more prominent in the calculations of US officials” (1992, 62).

2.2.2.2 Importers – “Countries of Concern” / China

As mentioned in the Introduction, I focus on export destinations advanced countries have identified as “countries of concern.” The security externalities of sensitive trade with allies or other close partners are much less significant than they are with countries of concern, and the tension states face in making exports to friends is less theoretically and practically interesting. Many of my interviewees remarked that China was one of the main points of divergence between advanced countries in their dual-use exports.

China is not only the largest exporter in the world, but the second-largest importer, its most significant import partners being Japan, the EU, South Korea, and the United States, in descending order. While it is plausible to include other recipient countries in this study, the US government notes that “China continues to be one of the largest foreign markets for controlled items” and that “Historically, the dollar value of trade with controlled destinations, other than China, has been low” (“Annual Report to the Congress for Fiscal Year 2011” 2011, 61). Thus, while China presents an easy case for finding divergence among exporters as a recipient of controlled exports, is also the most substantively important case.

The United States and Japan export billions of dollars’ worth of sensitive dual-use technologies to China each year, while the UK exports hundreds of millions’ worth. Somewhere “around 15% of Japanese exports to China are of sensitive items” (Marukawa 2013, 487). China is also one of the top countries for license refusals, the UK reports. China’s civil-military relations, human rights issues, and the arms embargo are among reasons why countries must be careful about their dual-use exports to China. Understanding variation in how similar countries make decisions

on the export of the same dual-use exports to China promises to uncover various motivations behind their China policy, and more generally, how they balance security, economic, foreign policy goals or other non-material factors.

Exports to China pose an especially vexing problem because China has a huge and enticing market, yet there is no clear line between civil and military operations. There is no real assurance that a dual-use technology will not be used for military ends. With the regional, international, and human rights threats China may pose, China epitomizes a dual-use dilemma, or, in Segal's words, "is the poster child for the double-edged nature of the globalization of technology," at least from the US perspective (2007). While China may be an outlier relative to other importers due to its size, it is certainly the most important case when it comes to trade and security concerns.

Therefore, in my analysis I compare trade from the United States, Japan, and the UK to China (representing a "country of concern") versus to the rest of the world. I evaluate trade patterns from 1998–2014, which provides me with 16 years of data. Major diplomatic or security events during this period include summer 2008, when human rights issues and abuses came to the fore with the Beijing summer Olympics, and September 2010, when the East China Sea disputes which were touched off after Japanese coast guard ships collided with a Chinese trawler in disputed territory. Territorial disputes in the East and South China Seas have been ongoing since.

2.2.2.3 Technologies

There is no lack of high-quality trade data, particularly from advanced countries. Through their customs agencies, the World Customs Organization, and the UN, among other organizations, countries keep records of and make public their imports and exports. The UN maintains the most comprehensive database on global trade, in conjunction with the World Bank.

In contrast, researchers in the field of export controls have long struggled with the lack of publicly available data on controlled exports, particularly data that is comparable across countries. Licensing data is closely held. The UK releases the most detailed data on licensed exports—it has reported the rating (ECN), license count, and license value for every country it exports to annually since 1999. It also reports some details on which licenses they refused (denied). The Campaign Against Arms Trade has extracted that data use to create a user-friendly, searchable Internet database.¹⁸

The United States has provided a more limited slice of licensing data since 1998—only exports to so-called “Country D” group countries, which are countries for which exports are restricted due to national security, nuclear, chemical and biological, or missile technology concerns, or are subject to US Arms embargo.¹⁹ It only reports the export control number and value of the license and does not include license denial information in its report (reasons for and numbers of licenses denials can be found in a separate annual report on foreign policy export controls, but this report does not detail countries to which exports were denied). Fortunately for this dissertation, Country Group D also represents the importers of interest, but the drawback is that US licensing data does not allow for comparison with non-sensitive destinations. Such information could allow for better comparison of licensed exports to countries of concern with “safe” destinations. Other producers like Japan, France, and Germany publish no dual-use

¹⁸ “Resources: UK Arms Export Licences,” Campaign Against Arms Trade, accessed 5 June 2016, <https://www.caat.org.uk/resources/export-licences>.

¹⁹ These are Afghanistan, Armenia, Azerbaijan, Bahrain, Belarus, Burma, Cambodia, Central African Republic, China (PRC), Democratic Republic of Congo, Cote d’Ivoire, Cuba, Cyprus, Egypt, Eritrea, Georgia, Haiti, Iran, Iraq, Israel, Jordan, Kazakhstan, North Korea, Kuwait, Kyrgyzstan, Laos, Lebanon, Liberia, Libya, Macau, Moldova, Mongolia, Oman, Pakistan, Qatar, Russia, Saudi Arabia, Somalia, Sri Lanka, Sudan, Syria, Taiwan, Tajikistan, Turkmenistan, Ukraine, United Arab Emirates, Uzbekistan, Venezuela, Vietnam, Yemen, and Zimbabwe.

licensing data. In fact, it is much easier to obtain data on arms exports from these countries than it is on their dual-use trade.

Another issue working with licensing data alone is that governments generally only require licenses for more sensitive destinations, and there are different types of bulk and multi-year licenses available depending on the export control system, the technology, and the destination. If you compared US licensed exports to China against US licensed exports to Germany, a NATO ally, you would see many more licenses for exports to China—but this by no means indicates that China has received more sensitive technologies than Germany. Rather, because Germany is a trusted country and multilateral export control regime member, exports to Germany are often exempted from requiring a license.

Thus using only the licensing data can be quite misleading, as I was cautioned in several of my expert interviews. Since licensing data artificially inflates controlled exports to countries of concern and underreports controlled exports to allies, Fuhrmann (2008) chooses to eliminate exports from the United States' closest partners and its enemies from his analysis. Yet since my research interest is in how countries determine whether they will export a sensitive item to a country of concern, his approach will not work for my study.

The data limitations mean that it is not possible to compare the amount of controlled or licensed trade across my countries of interest (the United States, the UK, and Japan) without a way to proxy for controlled trade. Yet there are no easy or obvious ways to measure the amount of licensed trade flows. In most countries, the bureaucratic office that controls dual-use licensing (the economic agencies) is separate from the one that controls actual export flows and data (Customs). Thus, the agencies may not have systems in place to communicate and share information easily,

and even if they do, this information is not public.²⁰ This structure is mirrored at the global level between the multilateral export control regimes (Wassenaar, Nuclear Suppliers Group, etc.) and the Customs regime (World Customs Organization).

Researchers have made various attempts to reconcile coding systems for exports and trade, without much progress to date. Several other researchers around the world are working on resolving this issue, from researchers to practitioners, with a functional (e.g., nuclear or chemicals) to regional (e.g., EU or Southeast Asia) focus. As Jones & Karreth note in their recent study, “Common to all studies of this genre are profound data limitations, principally arising from the trade classification schemes for dual-use items...and data availability issues” (2010, 14). With increased interest in the “big data” age in how to manipulate open-source data, more conferences are also tackling this subject, and my research contributes to these efforts.

At the domestic and international levels, there are two systems of numbers. The first is for customs, and is a 6-digit numerical base code (Harmonized System, HS code) that describes the item. Countries can add up to 4 more digits to this base 6-digit code for further clarification on the goods, and these extra digits are not consistent across countries. The second system is for export control purposes (which range from nonproliferation to regional stability), and employs a 5-digit alpha-numeric code, the ECN. The ECN, derived from the multilateral export control regimes, both express the type of technology and its capabilities. Countries use them in combination with export destination, customer, and the intended application to determine if an export license is required for a specific transaction prior to shipment.

²⁰ In the United States, Gerry Horner’s team at BIS is working on integration between the two, but even for the experts, comparing actual exports to licensed exports is a difficult and time-consuming task.

I build on licensing data but attempt to use the 6-digit customs code, which represents trade data that is publicly available for all countries and reported to the UN. Two recent studies that employ a similar method are both first cuts, but use HS code to ECN correlation to get a sense of controlled trade. The first uses HS codes to determine whether the 27 EU member countries are implementing similar controls on extra-EU exports of nuclear materials (Versino and Cojazzi 2011). The second study uses HS codes to determine the effectiveness of UN sanctions in keeping WMD material from North Korea (Kim 2015). A recent European Commission report also uses HS codes to get an estimate of EU dual-use trade in various sectors (“Final Report: Data and Information Collection for EU Dual-Use Export Control Policy Review” 2015).

Recognizing the importance not only for customs officials but for the exporters themselves, the EU has engineered a correlation table of dual-use goods to EU tariff code, and Singapore and China have created their own HS code concordance lists. From these, we can begin to get a sense of which customs (HS) codes correspond to which ECN codes. Yet, as many researchers have pointed out, this is a “many-to-many” correlation—so many HS codes apply to many ECN codes, and vice-versa. For example, the ECN “5A002” corresponds to 74 unique 10-digit HS codes, while the 10-digit HS code “8443991000” could of course be related to ECN “5A002,” but also “4A001,” “4A004,” or “4A003.” The EU correlation table provides no data on how likely a given HS code is to be caught under a specific ECN, or any ECN.

Moreover, while the alpha-numeric ECN codes are basically the same across countries (despite being called different names), and the HS codes are globally standardized to 6 digits, the more granular 9-to-10 digit codes are country-specific, so must be converted for comparison to be able to use them. It is preferable to use more granular HS codes when possible because the items

are more specific and therefore less likely to create “false positives” (i.e., including items for analysis that are not controlled).

Due to the data limitations, the researcher has two options: get only a very rough overview of possibly controlled dual-use items, with many false positives, or narrow the focus to only a few items that are very likely to be controlled. In this study, I chose to take the latter route.

I began searching for eligible dual-use cases by searching for items that met these two baseline conditions:

1. Technologies that the United States, UK, and Japan all produce
2. Technologies that constitute major licensed exports

As I mentioned above, licensing data is only available for the United States and the UK. Research and my interviews confirm that machine tools, carbon fiber, and semiconductors are among Japan’s most significant licensed exports, but while the United States exports a fair amount of carbon fiber and machine tools, the UK does not.

I use several proprietary and public sources to come up with a list of 14 ECN codes, relying on the US and UK licensing data for the top ECN exports, and also ensuring that they are technologies that the US, UK, and Japan all produce. With these ECN codes in hand, I then used the ECCN module of the CustomsInfo database to identify which HS codes came up most frequently for these codes.²¹ For this portion of the research I had to shift to US HS codes only as the database only has limited data on EU controlled exports and no information on Japan. I used the more granular HS-10 code (called “Schedule B” in the United States) to minimize the number of false positives.

²¹ Available from “Descartes: CustomsInfo,” accessed 5 June 2016, <http://www.customsinfo.com/>. Owned by Descartes Systems Group, Inc., and requires a subscription.

I then took the common HS codes and found how often they were claimed together with any ECN code, because for my purposes it matters less why an item is controlled than that it is controlled for some reason. From the original 14 codes, I was able to identify 8 HS codes that were likely to require some license more than half the time, which is not a perfect measure, but eliminates a good deal more of the false positives than other approaches. Again, a shortcoming of the data is that it is only available for the United States, so one has to assume that US allies control similar technologies, although given the United States' historical willingness to implement unilateral export controls, this is not guaranteed.

The eight HS codes represent five technology groups: encryption, navigation, thermal imaging, chemicals, and telescopic rifle sights, which fortuitously represent a range of technology type and reasons for control. Next, I take the US 10-digit HS (Schedule B) codes and convert them to their UK and Japan equivalents using the GTIM tab of the CustomsInfo database, while also cross-checking the ECN codes against the EU dual-use codes in the EU correlation table.

Finally, I use the 6-to-10 digit HS codes for the United States, the UK, and Japan, and collect the export of these three technologies over the period available (generally 1998-2014 or 2015). I detail the technology cases, their HS codes and ECN in the Technology Cases section of the next chapter.

Table 2.2 HS Codes/ECCN Example

6-digit HS code base (harmonized at international level by World Customs Organization): ²² 851762 = Machines for the reception, conversion and transmission or regeneration of voice, images or other data, including switching and routing apparatus
US Schedule B: 8517620050
UK Integrated Trade Tariff (based on 10-digit EU TARIC) HS code: 8517620090 ²³
Japan 9-digit HS code for exports (can differ from number for imports): 851762000
Likely to be controlled under US ECCN 5A002 (“Information security” systems, equipment and “components” therefor...) and/or 5A991 (Telecommunication equipment, not controlled by 5A001 [Telecommunications systems, equipment, "components" and "accessories"....])

I spoke with the person in charge of data collection for licensing at the US Department of Commerce Bureau of Industry and Security (BIS). He thought my approach was sound, and he also sent me the “crosswalk” they had retrospectively carried out for exports for the year 2010, which combined US customs and BIS data to identify which HS codes came up most frequently with each ECN. I used this to double-check the HS code/ECN correlation I had obtained from the ECCN module of the CustomsInfo database.

For my five technology groups (three of the technologies have two related HS codes each, while the other two technologies only have one related HS code each), I collected data on annual trade to China and annual trade to the World. I also collected data on my key independent variables and a number of control variables to test a regression model with various specifications for a new database, as I describe more fully in Chapter 4.

²² The HS Nomenclature comprises about 5,000 commodity groups which are identified by a 6-digit code and arranged according to a legal and logical structure based on fixed rules.

²³ The CN (EU 8 digits) is made of 9500 Subheadings. TARIC (EU 10 digits) includes 22300 Subheadings.

2.3 CHAPTER SUMMARY

This chapter provided an overview of export controls and reviewed the existing, related literature. It presented the research design and methods to test the hypotheses in addressing this study's research questions. The next chapter will provide more detail on the US, UK, and Japan export control systems and the five technology groups that are the focus of my empirical analysis.

Chapter 3. EXPORT CONTROL SYSTEMS AND CONTROLLED ITEMS

“Anything less than a united front with respect to multilaterally based export controls undermines their effectiveness.” - US Under Secretary of Commerce Kenneth Juster (2001)

This chapter provides background on US, UK, and Japanese export control systems. It also discusses the international system of export control numbers before providing details of the five technology cases that form the basis of the quantitative analysis in the next chapter. The export control system and technology descriptions provide identifications for my bureaucratic and salience approaches.

3.1 EXPORT CONTROL SYSTEMS IN US, UK, JAPAN

While the countries in my study (the United States, the UK, and Japan) all have robust export control systems, the structure of their export control systems varies. Since I test whether variation in bureaucratic systems can explain variance in dual-use exports to countries of concern—specifically, China—here I offer an overview of each countries’ export control system, including a brief history and review of their legislative systems. In particular, I focus on three aspects—the historical and legal basis for their systems, the number and types of agencies involved in export control licensing, and their stance on exports to countries of concern, especially China.

The information I provide primarily draws on my interviews with government officials and researchers, publicly available government sources, and existing overviews. One comprehensive comparison of export control systems, although some aspects are now dated, is Beck et al.’s five-country study on export controls in the United States, France, China, Russia, and India (2003). The

US Government Accountability Office has also issued a useful report on export control systems in Australia, Canada, France, Germany, Japan, and the UK—US allies with whom the United States has a great deal of defense trade (“Export Controls: Observations on Selected Countries’ Systems and Proposed Treaties” 2010). Some regional studies also exist, as do studies of the multilateral export control regimes, as discussed in Chapter 2.²⁴

3.1.1 United States

3.1.1.1 Legal Basis

The United States’ contemporary export control system has its origins in World War II, when the government created the first Export Control Act in 1940, one of its main goals being to limit the export of material to Imperial Japan. The Export Control Act of 1949 followed, becoming the first peacetime system of export controls. At this time, the government identified three rationales for imposing export controls: national security, foreign policy, and short supply. The executive branch, specifically, the Department of Commerce’s Bureau of Export Administration (BXA), became responsible for dual-use licensing. (Also in 1949, the United States along with 11 other countries established the North Atlantic Treaty Organization and CoCom.)

Then in 1969, the US government enacted the Export Administration Act (EAA) to replace the Export Control Act of 1949. The EAA provides the statutory authority for export controls on sensitive dual-use goods and technologies. In the EAA, Congress sought to establish a balance between protecting technology essential to national security and promoting trade for the first time. For example, Congress recommended that the licensing process explicitly take account of the foreign availability of controlled items. Beginning with amendments to the EAA in 1977, Congress

²⁴ See, for example Bertsch, Cupitt, and Yamamoto 1997; Joyner 2006; Meier 2013.

directed that US Department of Commerce Bureau of Industry and Security (BIS) identify and decontrol products with foreign availability unless they were essential to national security. Foreign availability of items subject to export control invokes four criteria: comparable quality, availability-in-fact, foreign source, and adequacy of available quantities that would render the continuation of US controls ineffective.

The government comprehensively rewrote the EAA in 1979, and with an amendment in 1985, the EAA forms the basis of the US export controls today. The 1979 EAA authorized controls on exports of commercial goods and technologies that would make a significant contribution to US military adversaries. It also authorized the continuation of controls to achieve US foreign policy objectives and reaffirmed continuing concerns about the short supply of strategic materials, particularly oil.

In 1976, Congress passed the Arms Export Control Act for defense items. In accordance with this act, the International Traffic in Arms Regulations (ITAR) sets out licensing policy. ITAR includes the US Munitions List (USML), which defines controlled items. The Directorate of Defense Trade Controls (DDTC) of the State Department administers ITAR. The separate lists for dual-use and arms exports are a distinguishing feature of the US export control system.

The period of “détente” ended in 1979 with the Soviet invasion of Afghanistan and the mounting evidence that the Soviets had used Western dual-use technology, obtained both legally and illegally after the relaxing of trade controls, to modernize its conventional and strategic forces. As a result, President Jimmy Carter acted under the provisions of the EAA to restrict the sale of US grain and to deny all pending and future validated export licenses for technology exports to the Soviet Union.

The Omnibus Trade and Competitiveness Act of 1988 (the 1988 Trade Act) came out of the “stagflation” in the 1970s and the 1980s, when the United States experienced persistent trade and budget deficits. The act significantly amended the 1979 EAA to reduce restrictions on exports. Before the passage of the act, the US unilaterally controlled virtually all proprietary technical data for exports to the Eastern Europe and the Soviet Union, even if it related to decontrolled goods. The act mandated that unilateral US national security controls on commodities and technology be eliminated. As a result, much previously controlled proprietary technical data could now be exported to Soviet bloc countries without a license. The 1988 Trade Act also mandated that the executive branch decontrol all national discretion items, except those for which CoCom explicitly agreed to continued controls. The act decontrolled most medical instruments and equipment, and eliminated re-export controls on foreign-produced products containing 25 percent or less US-controlled content of parts and components (the *de-minimis* rule).

The EAA expired in 1989, but Congress has reauthorized it for short periods of time, with the last incremental extension expiring in August 2001. At other times and currently, the export licensing system created under the authority of EAA has been continued by the invocation of the International Emergency Economic Powers Act (IEEPA). The EAA confers upon the President the power to control exports for national security, foreign policy or short supply purposes. It also authorizes the President to establish export licensing mechanisms for items detailed on the CCL, and provides some guidance and places certain limits on that authority. The CCL currently provides detailed specifications about dual-use items including what kind of equipment, materials, software, and technology (including data and know-how) requires an export license from the

BIS.²⁵ BIS administers the Export Administration Regulations (EAR), which, in addition to the CCL, describe licensing policy and procedures such as commodity classification, licensing, and interagency dispute resolution procedures (thereby implementing the EAA).

While the United States' export control system is one of the most staffed and developed, it is also one of the most complicated and has exhibited a tension between promoting and restricting exports over the history of its development. A major feature of the current export control system is that the legal basis for export controls, the EAA, expired in 1989, and emergency acts of Congress have since extended it. The other major point is that after many years of industry and foreign complaints and government studies, the United States is finally undergoing a major overhaul of its export control system, called Export Control Reform or ECR, from 2009.

One of the results of reform has been to move many of the items that had been on the State Department's munitions list to the CCL. The most notable among these changes of jurisdiction is those on satellite exports, which came into effect in 2013.²⁶ Under export control reform, the government plans on eventually updating every category of defense articles to better meet current national security and economic challenges. Many of the items moved to the CCL are now eligible for export without specific licenses as long as their intended end-use is by governments of 36 US allies and partners, while items remaining on the USML are still subject to the most stringent controls. The government has been careful to note that all of the controlled items on both lists

²⁵ After 9/11, in 2002, the BXA (Bureau of Export Administration) was renamed to BIS (Bureau of Industry and Security). The change was made to reflect the breadth of the bureau's renewed activities in the sphere of national, homeland, economic and cyber security.

²⁶ After a series of Loral/Hughes failed satellite launches on Chinese Long March rockets in the late 1990s, the American companies were accused of turning over sensitive information to the Chinese as part of a post-crash report. Congressional and Justice Department investigations, the Cox Committee Report and the Strom Thurmond National Defense Authorization Act for Fiscal Year 1999, resulted in the government moving satellites and related components from the CCL (dual-use list) onto the ITAR munitions list.

remain subject to the same US arms embargoes as before. Indeed, in February 2014, ECR tightened existing arms embargoes, especially against human rights violators.

Two other elements distinguish the US export control system implementation of export controls. The first is its policy on technologies of US origin and its re-export rules, which some countries describe as “extraterritoriality.” Even if a US product leaves the country and is further processed or mixed with foreign-made items and comprises beyond the *de-minimis* level, it remains subject to US re-export controls. If a foreign entity wants to re-export a controlled US product, it must first get US government approval. This holds for both ITAR and EAR regulations. The other is “deemed exports,” for which only the United States requires a license. The US considers the release of software or technology to a person who is not a US citizen or permanent resident to be “deemed” an export to that person’s country, regardless of whether the release takes place in the United States. Exports include the disclosure of technical data in tangible materials, i.e., manuals, drawings, etc. and also oral or visual disclosure of a controlled item. In contrast, in the European perspective, “export” requires transfrontier movement.

The US origin and deemed export aspects of implementation have frustrated US producers and foreign recipients alike, but the United States has been able to maintain these restrictions due to its global technological and production strength. The United States also has invested in export control outreach. It provides technical or financial assistance and cooperation, and sometimes pressures other states on their export control practices.

3.1.1.2 Bureaucratic Structure

In the United States, four government agencies have primary export licensing responsibilities: the Departments of Commerce, Energy, State and the Treasury. The majority of licensed exports go through the Commerce Department (for dual-use goods) and the Department of State (for defense

items). Energy handles certain nuclear-related exports while the Treasury handles some aspects of exports to sanctioned or embargoed countries.

The United States is different from many of its allies in that it does not have a single licensing authority for arms and dual-use goods, although the end goal of export control reform is supposedly a single licensing agency. The Department of Commerce administers trade prohibitions under the 1917 Trading with the Enemy Act and the 1977 IEEPA.

While the Department of Defense (DoD) is not a licensing agency in the US export control system, it plays a major role in export control policy decisions and in the determination of individual licensing cases, both for military and dual-use items. DoD provides input on which items State should control and which Commerce should control. The Office of the Secretary of Defense (OSD) and the Joint Staff sit in on all interagency export control policy reviews and issue discussions, “and their views are generally influential” (National Research Council (U.S.) 2009, n. 26). Furthermore, the Defense Technology Security Administration (DTSA), which is under OSD, reviews license applications for both munitions and dual-use items passed to them from State and from Commerce. DTSA might express concern about the technical capabilities of a proposed export, or how the export might enhance the military capability of a potential adversary.

“It is an extremely rare event that the Departments of State or Commerce (and especially the latter) can or will move ahead to approve a proposed export without the explicit, or at least the tacit, approval of the Department of Defense” (National Research Council (U.S.) 2009, n. 26). As one observer notes, “The Department of Defense, in particular...DTSA...is concerned for our

fighting forces, our soldiers, our war fighters and as you could expect they often seek tighter controls.”²⁷

In 2008, the United States approved 17,945 dual-use licenses with 56 licensing officers and 68,302 munitions licenses with 52 officers (“Export Controls: Observations on Selected Countries’ Systems and Proposed Treaties” 2010, 19).

3.1.1.3 “Countries of Concern” / China

The United States distinguishes among export destinations by “Country Groups,” which are labeled A, B, D, or E. Country Group A is the least regulated, and includes Wassenaar member states. Country Group B is a longer list of “free-world” countries, and many countries overlap between A and B. Country Group D is the “countries of concern,” such as Afghanistan, China, Democratic Republic of Congo, Iran, Iraq, North Korea, and Russia, and includes arms embargoed countries. The government controls exports to countries listed in Country Group D for various national security and nonproliferation reasons.

Of particular interest to this dissertation, the subset D:1 represents a “national security concern” to the United States (see Appendix A). China is a member of Country Group D and is flagged for D:1 National Security, D:3 Chemical and Biological, D:4 Missile Technology, and D:5 US Arms embargo, but not D:2 Nuclear. Country Group E are countries under an embargo, which is a short list of Cuba, Iran, North Korea, Sudan, and Syria in 2015. The different Country Groups are pertinent to the applicable controls and license exceptions. For example, a Limited Value Shipments (LVS) license exception is possible only to Country Group B. The United States also

²⁷ Jefferson Science Fellow Dr. James Harrington, who was a science advisor within the Department of State’s Bureau of International Security and Nonproliferation in 2005. View his remarks at “Dual-Use Technologies & Export Controls,” U.S. Department of State, accessed 5 June 2016, <http://www.state.gov/e/stas/series/154211.htm>.

maintains a Consolidated Screening List of end-users that is a combination of lists of suspicious or banned recipients compiled from Commerce, State, and Treasury. China is the primary location for such entities.

In the 1950s, the United States and its allies originally created a separate committee to control exports to China called ChinCom, which was more restrictive than CoCom. This disparity was called the “China Differential.” Five years later, they incorporated ChinCom into CoCom, but the United States maintained an embargo against China for another two decades. Western countries, including the United States, briefly loosened restrictions against China in the 1980s, but the Chinese government’s reaction to the 1989 Tiananmen Square protests resulted in a Western arms ban against China. The arms embargo never covered exports of dual-use items on the CCL, however.

In 2003, the participating states in WA issued a “statement of understanding” stating authorization was required for non-listed, dual-use items for military end-uses in UN arms embargoes or otherwise embargoes destinations. In the United States, some called this the “China catch-all rule,” although China is only one of some 15 embargoed countries. BIS interpreted it to mean that they would deny license applications to export items on the CCL (which includes more items than the Wassenaar dual-use list) to China for military end-use.

In 2007, the United States implemented the so-called China rule as part of its implementation of the terms of the WA understanding, and encouraged its allies to follow suit. Yet these attempts have been for the most part unsuccessful, according to a SIPRI report (Bräuner, Bromley, and Duchâtel 2015, 10). This divergence on China is at least in part due to the difference in threat perception among regime member states.

Under the China rule, exports of 20 categories of CCL items became subject to additional licensing requirements if they are, or may be intended for, “military end-use” in China. BIS also expanded requirements for end-user certificates (EUCs). In particular, exporters of most CCL items to China must obtain an EUC from China’s Ministry of Commerce, regardless of the end-user. At the same time, BIS also introduced a “Validated End-User” program, which eliminated individual license requirements for certain authorized customers in China. The idea was to help facilitate trade to trusted entities in China while strengthening controls on the most militarily sensitive items on the CCL. Meijer’s new book is an excellent source for understanding the tension in the United States between those that want to export sensitive items to China and those that do not (2016). He sees the China rule as the result of a compromise between two coalitions.

US top licensed exports to China include equipment for the manufacturing of semiconductor devices or materials; aircraft, including engines, equipment, and parts; mass spectrometers, machine tools, pressure transducers, and chemical manufacturing facilities and equipment; and broadcasting equipment and instruments for electronic and electrical testing (US licensing data and Cheng 2010).

3.1.2 United Kingdom

3.1.2.1 Features/Legal Basis

The UK’s contemporary export control system, like the United States, has its origins in World War II, in 1939, when the UK enacted the Import, Export and Customs Power (Defense) Act. This Act was the underlying legal basis for UK export controls until the turn of the next century. Following two government papers in the late 1990s, the government developed a new legislative framework for strategic export controls, including new controls on electronic transfers of controlled

technology and on brokering, and for improvements in licensing procedures. The Export Control Act passed the parliament in 2002 and was brought into force in May 2004, replacing the export control provisions of the 1939 Act.

The 2002 Export Control Act is now the main UK legislation on export controls for military and dual-use items. The Export Control Act's main achievements are a more transparent export control legal framework and extended parliamentary accountability. A number of individual orders made under the act have now been consolidated into one order, the 2008 Export Control Order, which came into force in 2009. The Export Control Order sets out licensing policy for military goods and dual-use items, while the UK's Military List and Dual-Use List define controlled items. Both lists incorporate all items in the WA and EU control lists.

Given the free movement of goods within Europe after the formation of the EU, it became necessary to begin harmonizing export controls among the member states. In 1994, the EU established its first set of common export control regulations, "establishing a Community system of export controls of dual-use goods" (Council Regulation (EC) No. 388/94 and Decision 94/943/CFSP). This was also the year the allies dissolved CoCom. In 2009, the EU updated its regulation to Council Regulation (EC) No. 428/2009 "setting up a Community regime for the control of exports, transfer, brokering and transit of dual-use items." This was the same year that export control reform began in the United States, indicating advanced countries' recognition of the continued importance of harmonizing and simplifying export controls in the post-Cold War, post-9/11 era. The 2009 regulation is binding and directly applicable throughout the EU.

Furthermore, the EU dual-use control list is now the de facto standard for other countries, as it incorporates the controls from all of the multilateral regimes. The EU Dual-Use and the US EAR list basically use the same export control numbers. Despite these efforts, however, various

sources have voiced concern about variance in member states' interpretation and implementation of the EU regulation (in part due to lack of capacity in some of the newer member states). Some member states, such as Germany and the UK, also implement export control provisions or control additional items beyond the regulation; some member states have general licenses while others do not; and the criteria for these licenses is inconsistent. Raising these and other concerns about such issues in export control implementation, the European Commission issued a green paper entitled "The dual-use export control system of the European Union: ensuring security and competitiveness in a changing world," and has been soliciting public comment.²⁸ The EU dual-use export control regime is currently undergoing its own reform process, and is slated for new regulations by 2017 or 2018 to reduce discrepancies in member-state implementation. The differences in dual-use export control implementation within Europe are a mini version of the tension between the multilateral regimes and the national implementation of export control lists.

Article 8(4) of the Regulation requires the Commission to publish measures that member states take to prohibit or impose an authorization requirement on the export of dual-use items not listed in Annex I of the regulation for public security or human rights reasons. The UK reports that it does indeed subject to authorization or prohibit dual-use items not listed in Annex I for these reasons per Export Control Order 2008, and sets out its controlled dual-use items in Schedule 3 of the Export Control Order 2008 (as amended by the Export Control (Amendment) (No 2) Order 2010). The UK also follows the EU Human Rights List (Annexes II and III of 2005 EC Regulation

²⁸ "Green Paper: The dual-use export control system of the European Union: ensuring security and competitiveness in a changing world," COM(2011) 393 final, European Commission, available from http://trade.ec.europa.eu/doclib/docs/2011/june/tradoc_148020.pdf (accessed 6 June 2016).

1236/2005), which enumerates prohibited goods to non-EU member states that could be used for capital punishment, torture or other cruel, inhuman or degrading treatment or punishment.

As for arms exports from the EU, in 1998, the member states also adopted the EU Code of Conduct on Arms Exports, which provides eight criteria on arms export controls. This Code of Conduct was further transformed into a Common Position at the end of 2008, and many Europeans mentioned this Common Position in my interviews with them. Nevertheless, the UK has tended to steer away from the creation of an EU dual-use common position, due to its concern with the European Commission's "competence creep."²⁹

While the EU Code of Conduct on Arms Exports was politically, but not legally, binding, with the Common Position, the EU became the only regional organization to have established a legally binding arrangement on conventional arms exports (the criteria are listed in the Appendix A for this chapter). The Common Position is relevant even for dual-use exports because they give a sense of the shared values of Europe in making export licensing decisions. In particular, the second criteria, "respect for human rights in the country of final destination" incorporates human rights considerations into export controls in a way that does not exist outside of the EU. Despite the UK's concern over the European Commission's competence creep, UK officials often mentioned the importance of human rights concerns in my discussions with them.

The features that distinguish the legal basis of the UK from the United States and Japan is its relatively recent codification of the current Export Control Act, and that the UK must also act under the EU dual-use export control regime.

²⁹ UK licensing official, Interview with author, London, 20 Nov. 2014.

3.1.2.2 *Bureaucratic Structure*

The Export Control Organisation (ECO) within the British Department for Business Innovation and Skills (BIS) is responsible for issuing and refusing licenses for the export of both military goods and dual-use items. UK BIS assesses all licenses against the Consolidated EU and National Arms Export Licensing Criteria (Consolidated Criteria). The Foreign and Commonwealth Office (FCO), the British Ministry of Defence and the Department for International Development (DFID) provide the ECO with advice on the assessment of export license applications. ECO refers particularly delicate or sensitive applications to government ministers in the FCO for a final recommendation.

UK's SPIRE licensing system allows companies to submit export license applications electronically and permits all agencies involved in the export control application review process to access the system to review and comment on applications. A system with this level of openness is unique among the developed countries. My interviews also gave the impression that the interagency review process was generally collaborative, not conflictual, as in the United States. Another key difference between the US and UK export control regimes is the "deemed export" rule, or, in the case of the UK, the lack thereof. The UK has technical data export controls, but no deemed export rule in respect to oral or visual exchanges of controlled technology and software with a foreign person.

Openly facilitating trade is an important objective of the UK export licensing process. The government offers open general licenses (OGEL), open individual export licenses (OIEL) and other similar licensing methods, allowing UK companies to export a number of countries, under certain criteria, without the need for a standard individual export license (SIEL). The open license is generally valid for a period of 5 years.

In 2008, the UK approved 9,936 licenses (both dual-use and arms) with 47 licensing officers (“Export Controls: Observations on Selected Countries’ Systems and Proposed Treaties” 2010, 19).

3.1.2.3 “Countries of Concern” / China

The UK can export even military items freely to the EU member countries (Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden).

Some open licenses are available from the UK/EU to Australia, Canada, Japan, New Zealand, Norway, Switzerland (including Liechtenstein) and the United States. The UK does not have a single list of “countries of concern” similar to Country Group D in the United States, but rather groups together different lists of embargoed destinations such as Libya, Iran, North Korea, South Sudan, and Syria. It also has a list of countries subject to military end-use control (see Appendix A).

In contrast to the United States and Japan, ECO does not generally publish information about specific end-users of goods for which an export license has been refused on end-use grounds, except for Iran. China is not on the export control different countries of concern lists. It is, however, one of 27 countries on the FCO’s human rights and democracy countries of concern list (now called a “human rights priority country”)—and has been for the entire period under investigation in this study. The UK implements the EU arms embargo on China via broader controls on arms exports and China is not subject to separate legislation. The government interprets the scope of the China embargo as:

- lethal weapons, such as machine guns, large caliber weapons, bombs, torpedoes, rockets and missiles
- specially designed components of the above and ammunition
- military aircraft and helicopters, vessels of war, armored fighting vehicles and other such weapons platforms
- any equipment which might be used for internal repression

(“Embargoes and Sanctions on China - Detailed Guidance - GOV.UK” 2016)

The government recently stated that it will not lift the arms embargo before seeing political and civil rights progress in China. The British Parliamentary Committees on Arms Export Controls (CAEC) continues to express concern about sensitive British exports to China. Recently, the CAEC questioned export of “equipment employing cryptography” and “cryptographic software” to China due to the potential uses of such technology in violations of human rights (Bräuner, Bromley, and Duchâtel 2015, 35).

The Campaign Against Arms Trade reported in 2000 that “equipment licensed for export to China has included airborne and ground based radar, military aerospace components, range finders, surveillance equipment, laser sighting and targetting equipment, military electronics, communications and navigation equipment. Military demolitions explosives, other military explosives and test equipment for small arms ammunition were also licensed.”³⁰

More than the arms embargo, human rights considerations, consideration of Japan’s geopolitical situation, and the desire to retain access to US military items inform the UK’s (arms)

³⁰ Robin Oakley, “Arms Trading Under an Embargo,” Campaign Against Arms Trade, accessed 6 June 2016, <https://www.caat.org.uk/resources/countries/china/trading-under-embargo>.

export strategy with China (Bräuner, Bromley, and Duchâtel 2015, 51–52). These factors likely come into play in dual-use licensing decisions as well.

For the UK, top licensed dual-use exports to China include equipment employing cryptography, semiconductor materials, nuclear materials, facilities and equipment, sensors and lasers, and aerospace and propulsion.

3.1.3 Japan

3.1.3.1 *Legal Basis*

Japan’s contemporary export control system has its roots in the 1949 Foreign Exchange and Foreign Trade Control Act (Law No. 228; “Gaitame-ho” or the “Trade Law”). Three years after establishing the Trade Law, Japan joined CoCom—Japan was still under the US occupation at the time (1945–1952). In addition to CoCom, Japan was also one of the original members of the WA, the Nuclear Suppliers Group, the Missile Technology Control Regime, and the Australia Group. Japan bases its national control list on the lists of each of these international regimes plus the EU Dual-Use Control Regime list.

Legislation supporting the Trade Law includes Cabinet Orders, Ministerial Orders, and notifications and guidance. The most important statutes under the Trade Law are two Cabinet Orders: the Export Trade Control Order (ETCO, or “Yushutsu-rei”) and the Foreign Exchange Order (FEO, or “Gaitame-rei”). The ETCO refers to controlled *goods* (Article 25 of the Trade Law) while FEO specifies controlled *technologies* (Article 48 of the Trade Law). Goods include machines, parts, and raw materials, while technologies include technologies for design, manufacturing and usage, including software. Ministerial Orders provide details like the specification and interpretation of listed items. Finally, notifications and guidance/notices

(interpretations) sit below Ministerial Orders in Japan's legal structure. Japan's multi-layer legal structure, although pervasive in the Japanese legal system, makes any regulatory change in export controls difficult to implement ("Overview of Japan's Export Controls [Fourth Edition]" 2015).

Japan's export control system was somewhat lax until after 1987, when the Toshiba machinery incident (Toshiba-Kongsberg Incident) surfaced, in which advanced machine tools were found to be exported from Japan to the Soviet Union in contradiction to Japan's export controls and CoCom. Politicians and officials in the United States were furious over this revelation and sought to punish Japan, ultimately imposing sanctions against Toshiba. In response, the Japanese government drastically enhanced its export controls by amending its basic law. It increased penalties and also required individual companies to establish internal compliance programs.

In 1989, it also established the Center for Information on Security Trade Control (CISTEC). As a non-governmental organization, CISTEC has a unique function to both provide outreach to industry and academia while also coordinating their requests for export control reforms. Another outcome of the Toshiba scandal is that Japan now very carefully controls the exports of machine tools, of which it is one of the world's major producers. Japanese companies often complain they were denied a license to the same factories in China where European machine tools are exported.³¹ Indeed, the government receives the greatest number of license applications for machine tools exports.³²

³¹ Japanese government official, Interview with author, Tokyo, 18 Sept. 2014.

³² Japanese government official, Interview with author, Tokyo, 23 Mar. 2015.

In 2009, the government issued an amendment of the Trade Law. The main points of the amendment were to review export controls on technology transfers, strengthen penalties, and establish standards for the internal compliance program.

Japan is unique in its stance on the export of military items. In 1967, the Prime Minister introduced a Japanese government policy of “Three Principles” for restricting arms exports under a Cabinet Decision. These guidelines state that Japan shall not export weapons to 1) communist countries, 2) countries subject to an arms embargo authorized by the UN Security Council, or 3) countries engaged in, or likely to be engaged in, international conflict. In December 2011, the ruling party, the Democratic Party of Japan (DPJ), decided to begin relaxing the ban on arms exports. The current party in power, the Liberal Democrat Party (LDP), is moving forward with this policy.

Under the new arms exports laws, arms exports are now permissible for two reasons: 1) contribution to peace and international cooperation; and 2) international joint development and production under strict control. The reasons behind this reform in arms exports are twofold. First, they allow Japanese manufacturers to participate more readily in joint development projects with allied nations. Second, allowing exports brings down development costs, a concern for most developed countries with defense industries.

Since the initial relaxing of the arms export ban in 2011, Japan announced that it would cooperate with the UK to jointly research and develop “arms” like chemical protective suits. In 2013, Japan’s Cabinet announced plans to participate in an F-35 joint strike fighter production and parts procurement program. Importantly, arms export license applications are still under a de facto “policy of denial” unless governments are involved in the export process.

Although the Japanese legal structure differs from the United States, its practice of export controls is comparable to the US Department of Commerce's administration of the EAR (Glasgow, Teplinsky, and Markus 2012, 26). One difference is in its handling of "deemed exports." Japanese nationals are treated as non-residents if they have lived outside Japan for more than two years, while foreign citizens working for a Japanese or foreign company in Japan, or who have been staying in Japan for more than six months are legally regarded as residents. In contrast, the United States determines the nature of an "export" to another person by citizenship, not residency. Like the United States and the UK, Japan also conducts numerous export control outreach activities in the region.

3.1.3.2 Bureaucratic Structure

In Japan, the Ministry of Economy, Trade and Industry (METI) is the main player in export controls, for both dual-use items and now arms as well, although the Ministry of Foreign Affairs (MOFA) has some input and represents Japan at the multilateral export control regimes, while the Ministry of Defense (MoD) engages on export controls on arms specifically.³³ According to Marukawa's history of Japan's export control system, when the parliament initially broached amendment of the Trade Law after the Toshiba machinery incident, MOFA demanded greater involvement in the approval process to reflect security concerns about trade policy, while the Ministry of International Trade and Industry (MITI) (now METI) aimed to minimize MOFA's involvement due to its concern about protecting free trade. The compromise they reached was to include a clause enabling MITI to "consult MOFA and other related ministries," and for MOFA

³³ Currently, the Ministry of Defense only has experience with processing the "export" of US military items from Japan to the United States for repair, overhauls, etc. Not surprisingly given its half-century long ban on arms export, no organization is fully able to support MoD on military export control matters.

and others to “express its opinion” in implementing export controls (Marukawa 2013, 491, citing newspapers Nihon Keizai Shimbun, July 21, 1987; Asahi Shimbun, July 23, 1987; Mainichi Shimbun, July 30, 1987). Marukawa argues that METI’s control over export control licensing, even after the amendment, “explains why economic objectives have often been given more weight than security concerns in Japan’s export control” (2013, 491).

Due to METI’s preeminence, Japan’s export control system is more streamlined than that of the United States, where the Commerce, State, and Defense departments and other agencies have a say in the export control process. Japan issues about the same number of export licenses as the UK or France, a figure drastically smaller than that of the United States.³⁴ Although METI is the main ministry handling the majority of Japan’s export control licensing, it has a relatively small number of bureaucrats working on export controls. About one hundred officers work on export controls, including those in regional branch offices (GAO reports 30 officers, which does not include the regional offices). METI provided the US government with an estimate of 10,000 individual licenses annually, primarily for dual-use exports due to the arms export ban (“Export Controls: Observations on Selected Countries’ Systems and Proposed Treaties” 2010, 19).

3.1.3.3 “Countries of Concern” / China

Japan has two ways of categorizing end-users, by destination country and by a foreign end-user list that enumerates specific entities. Japan distinguishes between destination countries as “white countries,” “non-white countries,” “countries of concern,” and UN arms embargo countries.³⁵

³⁴ US Governmental Accountability Office, “Export Controls: Observations on Selected Countries’ Systems and Proposed Treaties” (2010). According to a 2014 Congressional Research Service (CRS) report, in FY2012, BIS processed 23,229 export license applications worth about \$204.1 billion, \$113.6 billion of which were licenses for crude oil exports.

³⁵ Despite poorly translating into English, these are not racially motivated groupings.

White countries are 27 countries that participate in all four international export control regimes, such as Norway, Sweden, Finland, and the UK (see Appendix A). Exports to these countries are the least regulated. (The white country list contrasts with the United States' Country Group A, which lists some states that are not members of all four regimes). A General License (which Japan calls a "bulk license") is available for white countries, and to non-white countries for certain items. Countries of concern are Iran, Iraq, North Korea, but no longer Pakistan.

As for China, Japan does not have an arms embargo against it, but until recently, Japan could not export arms. It has, however, exported a significant amount of dual-use goods to China and other countries in its modern history. According to Marukawa, "Japan has been one of the most aggressive among Western nations in expanding trade and investment relations with China" (Marukawa 2013, 485). As a specialist in China, Marukawa provides an excellent history of Japan-China relations on export controls in his article and in my interviews with him. He emphasizes US pressure on Japan to control trade with China.

He also draws on research showing that Japan's commitment to CoCom was more about maintaining a good economic relationship with the United States than concerns about its own security (Marukawa 2013, 488). Indeed, during the CoCom years, Japanese businesspeople and the media came to see CoCom as an obstacle to pursuing their business interests in China and Eastern Europe. Like the United States, Japan differentiates between controlled exports going to China versus going to Taiwan.

While China is treated as a non-white country, and therefore no different than the other some 150 countries in the world that are neither white nor UN embargoed, when it comes to the foreign end-user list, China's presence is great. The most recent (March 2016) version of the foreign end-user list features entities in Afghanistan, UAE, Iran, Israel, India, North Korea, Syria,

Taiwan, China, Pakistan, and Hong Kong. These are “foreign entities for which concern cannot be eliminated regarding involvement in activities such as the development of weapons of mass destruction (WMDs) and other items,” according to METI.³⁶

Japan’s top dual-use exports to China include integrated circuits, other electrical machinery, optical, measurement and analysis instruments, machine tools, metals, explosives, and radioactive isotopes (Marukawa 2013).

3.1.4 Summary

To summarize the preceding section, the contemporary export control systems in the United States, the UK, and Japan all have their roots in the period directly after World War II. They have followed different trajectories over the years and have different legal and bureaucratic structures. The United States is the only country that has separate lists and licensing authorities for military and dual-use items. Japan has perhaps the most complex legal structure of the three countries, but also the most streamlined system in the sense that METI is the only major player. Such heavy reliance on its economic agency may result in over-emphasis on the economic side of export controls.

Despite being close allies, the way these three countries handle as “countries of concern” in their export control regulations also varies. When it comes to dual-use exports to China specifically, the United States and Japan most resemble each other (although Japan does not list China as a country of concern), while the UK is less restrictive. The UK, however, is unique in being under EU dual-use regulations and also in explicitly incorporating human rights considerations into its export control licensing decisions.

³⁶ “Review of the End User List,” Ministry of Economy, Trade, and Industry, accessed 5 June 2016, http://www.meti.go.jp/english/press/2016/0329_01.html.

3.2 EXPORT CONTROL NUMBERS

The multilateral export controls regimes each have a list of items the participating states agree should be subject to controls.

For the WA, the dual-use control list includes “goods and technologies...which are major or key elements for the indigenous development, production, use or enhancement of military capabilities.” In deciding whether to add an item to the list, member states should take into account the following criteria: 1) Foreign availability outside Participating States; 2) The ability to control effectively the export of the goods; 3) The ability to make a clear and objective specification of the item; and 4) Controlled by another regime (“Criteria for the Selection of Dual-Use Items,” n.d.). In other words, if items are available from non-regime member states, are too difficult to control or define, or another regimes control them, they are unlikely to make the WA control list.

As mentioned previously, countries agree to dual-use controls at the multilateral level and then implement them into their national rules. The UK also incorporates the Dual-Use European Community (DUEC) list into its Strategic Export Control List. The DUEC numbers derive from Annex I and IV to Council Regulation (EC) No. 428/2009. The EU calls the DUEC numbers “category numbers.” The EU implements the WA Dual-Use Goods List essentially as is, with only some minor changes in style and layout. The EU list categories 1-9 are identical to the WA categories.³⁷

The United States calls its export control numbers Export Control Classification Numbers (ECCN), while the UK calls them “ratings.” The technical parameters and the category numbers

³⁷ For example, “WA 2.B.4. Hot ‘isostatic presses’ having all of the following, and specially designed components and accessories therefor...” becomes “EU 2B004 Hot ‘isostatic presses’, having all of the following, and specially designed components and accessories therefor...”

are essentially the same in national control lists as they are based on the same dual-use regulations. When referring to export control numbers in general, I refer to them as export control numbers (ECN), which is the most broadly used term.

While Japan adopts the multiple regime control lists into its own, its classification structure is based on a “Parameter Sheet” or *Komoku-betsu Taihi Hyo* (classification check sheet) for its Commodity Control List—it does not use ECN. The categories Japan uses, such as Category 1 for Arms and Category 2 for Nuclear Items is different than the categories for the United States or EU/UK. METI did, however reluctantly, release a correspondence table format with ECN for matching Japan’s parameter sheet to the EU dual-use codes. Japan’s list distinguishes between arms (Category 1), dual-use items (WMD and Conventional Arms) (Categories 2–15), and then a catch-all category for WMD and Conventional Arms (Category 16). Wassenaar Category 1–9 fit into the Japanese categories 5–15.

If one compares control lists between countries, generally the discrepancies are few, but countries might set the technical threshold higher or lower for controlled items in their national control lists. Or technical notes might exempt certain items in the US, but the UK or Japan might not have that note.

An ECN comprises five alpha-numeric digits. The first digit refers to the control category (0 = nuclear materials [in the United States this also includes National Security reasons]; 1 = materials, chemicals, microorganisms and toxins; 2 = materials processing; 3 = electronics; 4 = computers; 5 = telecommunications and information security; 6 = sensors and lasers; 7 = navigation and electronics; 8 = marine; 9 = aerospace and propulsion). The second digit represents the product group (A = systems, equipment and components; B = test, inspection and production equipment; C = materials; D = software; E = technology). The third digit indicates the regime

origin (0 = Wassenaar Arrangement; 1 = Missile Technology Control Regime; 2 = Nuclear Suppliers Group; 3 = Australia Group; 4 = Chemical Weapons Convention). The remaining numbers give more specifics.

In the case of the United States, a “9” in the third digit represents a unilateral control.³⁸ The numbers in either the second or third digit serve to differentiate between multilateral and unilateral entries. An entry with the number “9” as the second digit, identifies the entire entry as controlled for a unilateral concern (e.g., 2B991 for Anti-terrorism reasons). If the number “9” appears as the third digit, the item is controlled for unilateral purposes based on a proliferation concern (e.g., 2A292 is controlled for unilateral purposes based on nuclear nonproliferation concerns).

Generally, if the last three digits begin with a “zero” or “one” (e.g., 4A001), the product is subject to stringent controls, whereas if the last three digits are a “9XX” (e.g., 4A994), generally there are fewer restrictions on export. Third-digit reasons for control include Anti-terrorism, Crime Control, Regional Stability, Short Supply, UN Sanctions, etc. The fourth digit is for numerical ordering. So 5A002 represents “Systems, equipment, electronic assemblies, and integrated circuits for ‘information security’” and 5D002 “encryption software,” which both are controlled under WA, but the United States also has additional controls under numbers 5A992 for “mass market” encryption commodities and other equipment not controlled by 5A002; and 5D992 for encryption software not controlled by 5D002.

³⁸ A new series of digits starting with a “6,” or the so-called “600 series,” controls items because they are items on the Wassenaar Arrangement Munitions List (WAML) or formerly on the US Munitions List (USML). The last two characters of each “600 series” ECCN generally track the Wassenaar Arrangement Munitions List (WAML) categories for the types of items at issue. The WAML ML21 (“software”) and ML22 (“technology”) are, however, included in D (“software”) and E (“technology”) CCL product groups to remain consistent with the structure of the CCL.

In the US government’s words, “The five character alpha-numeric ECCN identifies the technology level and the capabilities of an item which, in combination with the country of destination, customer, and the intended application, determine if an export license is required for a specific transaction or whether an item can be exported without a license. The ECCN must be determined prior to shipment” (“International Logistics: Export Control Classification Number - ECCN” 2016).

3.3 TECHNOLOGY CASES

From the procedure I carried out described in Chapter 2, I came up with five groups of technologies that present a range of concerns and regimes controlling them. In the remainder of this chapter, I provide a background on each of my five technology cases—encryption technology, navigation, precursors for toxic chemical agents, imaging cameras, and telescopic rifle sights—to preface the quantitative analysis in the next chapter. Each group has different reasons for control. Aside from chemicals, the technologies fall under the WA, as seen in the third digit of the export control number digit being “0,” or are under unilateral control in the United States, as the “9” represents.

Unfortunately, as mentioned in the previous chapter, HS code to ECN comparisons do not exist outside the United States, which is why some unilaterally controlled technologies are captured in my analysis. But they are still interesting to analyze because it means the United States is concerned enough about the security implications of these items to potentially control them unilaterally.

Of the five technology groups, export controls on encryption, chemicals, and thermal technologies have gotten the most attention for their security risks, at least in the West. Below I describe each of my technology cases in more detail.

3.3.1 Technology Group 1 – Encryption-related

- HS Code 847150: Digital Processing Units
 - Likely to be controlled under US ECCN 5A992, 5A002, or 4A994
- HS code 851762 : Machines for the reception, conversion and transmission or regeneration of voice, images or other data, including switching and routing apparatus
 - Likely to be controlled under US ECCN 5A002 or 5A991

Countries have controlled the export of encryption-related technologies since World War II due to the military value of cryptography, but since the rise of the personal computer, electronic commerce, and the diffusion of the Internet, encryption has served many civil and commercial purposes as well. Thus there has been a great deal of debate over non-military encryption export controls since the 1990s.

Countries control the digital processing units and machines in my first technology group not for the physical technology per se, but rather their use for information security/encryption, as can be seen in their primary ECN starting with “5” (telecommunications and information security). Digital processing units are a configuration of computers or chips specifically designed to process signals to give better reception, quality, etc. They are usually a standalone unit designed for digital signal processing.

Governments have made various changes in the regulations on encryption controls over the years. The first major change after the end of the Cold War and CoCom was the 1996 transfer of dual-use encryption items from the United States Munitions List to the CCL. The transfer applied to all encryption items except for those specifically designed, developed, configured, adapted or modified for military applications—these still remain in the USML. This rule was part

of the Clinton Administration's effort to promote the growth of electronic commerce and secure communication worldwide while also protecting public safety and national security.

Then in 2010, US BIS made significant changes to export controls on encryption items to enhance national security. The idea was to better focus of controls and streamline the collection of information on encryption products. Encryption export control reform was one of the first steps in the export control reform initiative. Two achievements were removing the technical review requirement for the exports of most "mass market" encryption items and releasing most encryption items from a semi-annual reporting requirement.

One important difference between the United States and the EU is that the EU does not have anti-terrorism controls, under which encryption falls via ECCN 5A992, 5D992, and 5E992 in the United States. Yet the EU has increasingly focused on human rights considerations in export licensing decisions, as reflected in the EU Parliament resolution of 2012.³⁹ Both US and UK license denials for Wassenaar Category 5 items spiked in 2013. Notably, components for "mass market" encryption still requires an export license in the EU, although the United States decontrolled these items.

As far as the issues surrounding implementation of surveillance software controls following the 2013 WA list update, BIS proposed several new ECCN numbers to add to the CCL.⁴⁰ Japan and the EU implemented the new controls in 2014. Usually, the United States is one of the

³⁹ EU Parliament resolution 23 October 2012 proposed: end use controls for items not on EU control list which "are or may be intended (...) for use in connection with a violation of human rights, democratic principles of freedom of speech (...) by using interception technologies and digital data transfer devices for monitoring mobile phones and text messages and targeted surveillance of internet use (...)"

⁴⁰ "Wassenaar Arrangement 2013 Plenary Agreements Implementation: Intrusion and Surveillance Items," Office of the Federal Register, accessed 5 June 2016, <https://www.federalregister.gov/articles/2015/05/20/2015-11642/wassenaar-arrangement-2013-plenary-agreements-implementation-intrusion-and-surveillance-items#h-10>.

earliest countries to implement regime rules. In this case, as of mid-2016, the United States has yet to update its lists and instead plans to go back to WA for renegotiation.

3.3.2 Technology Group 2 - Navigation

- HS code 901490 - Parts for Direction-Finding Compasses, likely to be controlled under US ECCN 7A994, 9A991)
- HS code 901420 - Instruments and appliances for aeronautical or space navigation (other than compasses), likely to be controlled under US ECCN 7A994, 7A002

The second group of HS codes I cover represent navigation, communication and avionics equipment. The first HS code could refer to parts for GPS units, while the second group excludes compasses. Examples of the second HS code are a navigation aid using a computer, gyroscopes, and accelerometers for airplanes or outer space vehicles. Broadly, WA controls navigation and avionic devices due to their important military applications, but these technologies are equally important technologies for civil air- and spacecraft.

As can be seen in the third digit of their ECCN codes, the controls on these items are mostly unilateral in the United States. The ECCN 7A994 captures some low-end, mass-produced consumer goods, and 9A991 is a sort of default category for aircraft parts. Certain military end-use restrictions apply in the United States for exports to China specifically of technologies covered by the aerospace ECCNs, including 7A994 and 9A991. The public debate over these particular controls has been muted compared to encryption or thermal technologies, aside from their association with satellite technology specifically. Therefore navigation exports may invoke less of a salient concern for licensing officials, except in the case of US exports to China.

3.3.3 Technology Group 3 - Thermal Imaging

- HS Code 902750 / US Schedule B Code 9027502000: Thermal analysis instruments and apparatus
 - Likely to be controlled under US ECCN 6A993, 6A003

Thermal imaging technologies have various practical applications. Firefighters use thermal imaging but so does the military in accessories such as night-vision goggles. While infrared cameras have hundreds of non-military applications, in the words of one manufacturer, “This...does not change the fact that they are first and foremost military items in the eyes of the US government.”⁴¹ Thermal imaging cameras are both controlled under ITAR as munitions (cooled midwave or longwave cameras) and under the EAR as dual-use goods (dual-use thermal imaging cameras based upon uncooled infrared focal plane arrays).

The difference between ECCN 6A003 and 6A993 is whether the imager frame rates are greater than or less than or equal to 9 Hz, respectively. In general, cameras with greater than 9 Hz frame rates have higher levels of restrictions than cameras with frame rates under 9 Hz. The ECCN 6A993, which is also unilateral, has a “no license required exception” in the United States except for Country Group E (terrorism supporting countries) and, as of 2009, China.⁴²

In 2012, US BIS released a paper titled, “Critical Technology Assessment: Night Vision Focal Plane Arrays, Sensors, and Cameras.” The paper was in response to manufacturers of

⁴¹ “Export Terms and Guidelines,” Sierra-Olympic Technologies, Inc., accessed 5 June 2016, https://www.sierraolympic.com/images/uploads/documents/SOTI_Export_Guidelines_140701_v02.pdf.

⁴² Addition of Certain Cameras to the List of Items That Require a License for Export, Reexport or Transfer to Certain Military End Uses in China. Supplement No. 2 to part 744 of the EAR lists items for which § 744.21 of the EAR requires a license for the export, reexport or transfer to certain military end-uses in the People's Republic of China. This rule adds cameras controlled by ECCN 6A993 to Supplement No. 2 to part 744. BIS is taking this action consistent with United States Government policy of not supporting China’s military modernization efforts (2009).

imaging cameras controlled under ECCN 6A003 complaining to the Department of Commerce that there is considerable foreign availability of these items from Europe, Japan, and China. Foreign availability and differences in licensing practices were major factors that led the Department of Commerce to revise regional stability controls on certain thermal imaging cameras in a regulation published on May 22, 2009 (74 FR 23941). The regulation eliminated licensing requirements for certain cameras when exported to 37 countries, reduced licensing volume significantly, and mitigated industry's concerns about foreign availability.

The Critical Technology Assessment notes that consequently, there was a spike in both US and non-US dual-use uncooled infrared camera sales from 2009–2010. This spike in sales coincides with the implementation of the 2009 rule that reduced licensing requirements to some regime partners for dual-use uncooled infrared cameras controlled under ECCN 6A003. The report also states that uncooled infrared camera manufacturers have the largest number of non-US competitors, followed by cooled infrared camera manufacturers. The major US foreign competitors are located in France, the UK, and Japan (Telesco and Katarine 2012, 404).

The following quote encapsulates the inter-bureaucratic debate over the control of thermal imaging cameras in the United States in the eyes of one participant: “It is a very contentious subject and I will tell you that the whole area of sensors and cameras is one of the key areas for the United States in terms of control. The other stuff somewhat pales, I shouldn't put it that way, before sensors and cameras, because it is so critical. And therefore what I see are the arguments between Defense and Commerce with State in the middle and I am getting buffeted about.”⁴³ Thus, we may expect thermal imaging to trigger fairly salient military-related concerns in the minds of US

⁴³ James Harrington, “Dual-Use Technologies & Export Controls,” U.S. Department of State, accessed 5 June 2016, <http://www.state.gov/e/stas/series/154211.htm>.

licensing officials, but perhaps not in the UK or Japan, for which there is little evidence of these kinds of debates over thermal imaging.

3.3.4 Technology Group 4 - Chemicals

- HS code 283711: Sodium Cyanides And Sodium Cyanide Oxides, likely to be controlled under ECN 1C350
- HS code 292213: Triethanolamine And Its Salts, likely to be controlled under ECN 1C350

Of the five groups of technologies I cover, chemical weapons precursors are the most likely to be controlled (with a 70 to over 90 percent match rate of HS code to ECCN 1C350). Chemicals are dual-use because they have many important commercial applications, including for pharmaceuticals. Countries control their export particularly after the Iran-Iraq War and more recently the 2013 Syrian civil war. The Australia Group, not the WA, controls chemical and biological weapons precursors. Unlike WA, the Australia Group has a no-undercut policy such that if one participant wants to approve a license essentially the same as a license another participant denied, it must first consult the denying state. Chemical exports are also subject to the Chemical Weapons Convention (CWC).

The first HS code is for cyanides and cyanide oxides of sodium, an inorganic chemical. Commercial uses of sodium cyanide include dyes & pigments; gold and silver mining and electroplating. The second chemical is triethanolamine (TEA) and its salts, an organic chemical, and slightly less likely than sodium cyanide to be controlled. Commercial uses include production of surfactants, corrosion inhibitors, cements, lubricants, and cosmetics. TEA is a common ingredient in shampoos, shaving creams and other cosmetics, but is also a precursor to nitrogen

mustards, which can be used as chemical warfare agents that cause blistering. Both are covered under Australia Group as a chemical weapons precursor and under CWC Schedule 3. Schedule 3 chemicals include those that can be used to produce, or can be used as, chemical weapons, but which are widely used for peaceful purposes; such as phosgene, sodium cyanide, and triethanolamine.⁴⁴

As public or government officials do not seem to debate the importance of controlling chemical weapons precursors, perhaps because of their high proliferation potential and their control under the CWC and the Australia Group, we may expect less divergence in export control licensing decisions for chemicals. It could be, however, that the strong commercial interests in chemicals outweigh security considerations, depending on the importer and the relevant agencies involved in export licensing.

3.3.5 Technology Group 5 - Telescopic Sights

- HS code 901310: Telescopic Sights for fitting to rifles
 - Likely to be controlled under US ECCN 0A987

Whether it is appropriate to include telescopic sights is debatable, as the UK controls these as military items. But Japan has long been exporting telescopic rifle sights despite its bans on arms exports, so it is interesting to evaluate if an item being on the military versus dual-use list affects exports, particularly considering that China is under an arms embargo. A telescopic sight, commonly called a scope, is a sighting device that is based on an optical refracting telescope. It is equipped with a graphic image pattern (reticle) and mounted to give an accurate aiming point.

⁴⁴ “Chemical Weapons Convention (CWC),” ChemSafetyPro, accessed 6 June 2016, http://www.chemsafetypro.com/Topics/Convention/Chemical_Weapons_Convention_CWC.html.

Many systems that require accurate aiming use telescopic sights, most commonly firearms, particularly rifles.

In the United States, in 1999, the Bureau of Export Administration (BXA) published a final rule (64 FR 17968) that added ECCN 0A987 to the CCL for optical sighting devices for firearms. Prior to that rule, optical sighting devices for firearms were controlled under ECCN 0A985. In the United States, BIS has jurisdiction over shotguns with a barrel length of 18 inches or more and related components. BIS also has jurisdiction over muzzle loading rifles and handguns, air guns, replica firearms, shotgun shells and components, and most optical sighting devices for firearms.

In the UK, I learned that rifle sights fall under ML1d on the military list. ML1d in the UK represents “Sound suppressors or moderators, ‘special gun-mountings,’ optical weapon sights and flash suppressors, for firearms specified in ML1.a., ML1.b. or ML1.c.” but the accompanying note also says that “ML1.d. does not control: a. Optical weapon sights without electronic image processing (i.e., using only lenses to view the target), with a magnification of 9 times or less, provided they are not specially designed or modified for military use.”⁴⁵ Thus it seems that the UK should be exporting at least some lower specifications of sights as dual-use items, but it does not report dual-use licenses on these items. Meanwhile, Japan actually has a fair amount of rifle sight exports, which makes sense given its commercial strength in cameras. Yet these could be seen as risky exports to China for Japanese licensing officials since they have direct military application. US officials might also balk at the prospect of a potentially military-related good going to China.

⁴⁵ “UK Military List,” Department for Business Innovation & Skills, accessed 5 June 2016, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/422370/militarylist20150417.pdf.

3.4 CHAPTER SUMMARY

This chapter has covered the legal and bureaucratic features of the export control systems in the United States, UK, and Japan, and in particular how they define countries of concern and handle exports to China. It also detailed the five technology groups I investigate in my quantitative analysis in the next chapter.

Chapter 4. QUANTITATIVE ANALYSIS

“Common to all studies of this genre are profound data limitations, principally arising from the trade classification schemes for dual-use items...and data availability issues.” - Scott Jones and Johannes Karreth, “Assessing the Economic Impact of Adopting Strategic Trade Controls”

The objective of this chapter is to address the variation in exports of controlled technologies among similar countries on the same technologies. Specifically, I use quantitative data to test the six hypotheses I present in Chapter 2 based on the realist, liberal, bureaucratic politics, and salience approaches to explaining levels of controlled exports.

I begin by addressing my first research question, whether there is evidence of variance in implementation of export controls on exports of sensitive items among similar countries. Finding such evidence, I then explore possible reasons for this variation using my six hypotheses.

4.1 RESEARCH QUESTION 1: COOPERATION AMONG SIMILAR EXPORTERS?

My first research question is: How much do advanced countries cooperate on dual-use export controls, particularly to countries of concern? I answer this assessing how different countries implement export controls on the same sensitive technologies. Specifically, I measure how many dual-use items countries export compared to other countries, and compared across different technologies. This measurement also becomes the dependent variable for my second research question.

To assess levels of controlled trade by country and technology, I collect the annual value of exports in current (“nominal”) USD for eight HS codes that represent five technology groups:

encryption, navigation, thermal imaging, chemicals, and telescopic rifle sights. I discussed my reasons and methodology for collecting data on these eight HS codes as representative of important dual-use trade in Chapter 2. I collect the value of these exports both to China and to the World for all years available from the IHS Global Trade Atlas (GTA) database (1998–2015).⁴⁶ My unit of observation is HS code, country (exporter), year. The total value of controlled trade to China in the five technology groups I cover from the United States, the UK, and Japan combined equaled \$218,870,285 in 1998 and \$1,756,988,062 in 2015, which gives a sense of how greatly controlled trade to China has increased during this period, even taking into account inflation.⁴⁷

While I downloaded the most granular level of HS code (10 digits) available from the GTA database, most of the technologies I specify are also controlled at the 6-digit level, except where I note below. The different HS codes present different issues in terms of data collection, some more severe than others, which I now discuss.

4.1.1 Data Issues

Technology Group 1 – Encryption: One of the encryption HS codes (851762) only exists from the 2007 renumbering of HS codes (which happens every 5 years, but the majority of HS codes are unaffected). I therefore collected data for a ninth HS code (851780) for the years 1998–2006, which 851762 replaced from 2007. A related, important issue is that the ninth HS code is only about 20 percent likely to be controlled by any ECCN, so it may be preferable to drop this from the analysis completely and only look at HS code 851762 from 2007.

⁴⁶ “Global Trade Atlas,” IHS, accessed 5 June 2016, <https://www.ihs.com/products/maritime-global-trade-atlas.html> (available only by subscription). Ideally the analysis would include units or volume of controlled exports, not only dollar values, but this level of detail is not available for many of my exports of interest.

⁴⁷ The value of \$300 million in 1998 dollars is approximately \$436 million in 2015 dollars.

Technology Group 2 – Navigation: For one of the navigation HS codes (901490), Japan only provides data from 2010.

Technology Group 3 – Thermal Imaging: For thermal imaging technology, HS-6 code 902750 is rather unlikely to be controlled under any ECCN (less than 5 percent) but more than 30 percent likely to be controlled at the HS-10 digit level (U.S. Schedule B 9027502000). Unfortunately, data at an equivalent level of granularity (9- or 10-digit code) is not available from the UK or Japan. Thus I only download the more granular code for the US but not for the UK and Japan, which means the data may not be comparable across countries and capture more for the UK and Japan. As mentioned in Chapter 3, the United States is also more likely than the other countries to control thermal imaging technologies, so if the United States does not control it at the HS-6 level, it is highly unlikely the other countries do.

Technology Group 4 – Chemicals: The chemical weapons precursors are more likely than any other group to be a controlled export (35 to over 95 percent), and only under one ECCN (1C350), but the UK only provides data on HS code 283711 from 2001, and furthermore restricts that information to exports to the World/EU/Non-EU destinations. They report no exports to any country in Asia, including to China. Thus HS code 283711 is not comparable for the UK.

Technology Group 5 – Telescopic Sights: While the United States provides dual-use licensing data for ECCN 0A987 and therefore treats the relevant HS code 901310 (telescopic sights) as a dual-use export (and because Japan had a ban on arms exports, it also should be treating telescopic

sights as a dual-use item since it exports them in large quantities to many countries), according to a UK BIS licensing official, the UK does not have dual-use controls on gun sights under 0A987. The official said that the UK sights would be classified ML1d on the military list (ML1 = small arms). Practically speaking, this means that as with HS code 283711 in the chemicals group, telescopic sights are not comparable for the UK.

Because I do not have data for all the years for all countries, in the dependent variable, I have 68 missing observations for controlled exports to World and 97 to China out of 486 for each, so a total of 17% missing.

I now move to evidence to answer the first research question as to whether there is variance in implementation of export controls on exports of controlled items among similar countries. Figure 4.1 shows the annual percentage change (log) of the ratio of controlled trade to China to controlled trade to the World by country (the Japan plot is on top, UK in the middle, US on the bottom) and by technology (the colors in the legend).⁴⁸ The graph represents the percentage change in controlled trade to China minus the percentage change in controlled trade to World. The values on the Y-axis are negative because the log of a ratio ($\ln[\text{controlled trade to China}/\text{controlled trade to World}]$) is the difference of the logs, which in this case is $\ln(\text{controlled trade to China}) - \ln(\text{controlled trade to World})$, and the value of controlled exports to World is always greater than the value of controlled exports to China.

As the lines get closer to zero, China makes up a bigger proportion of total World exports. For example, for the earlier years in the sample, China made up nearly all of Japan's sodium

⁴⁸ Most economic variables show near or near constant percentage rate (e.g., GDP), so the log of these variables grow as a linear function of time. In the log of the variable, the coefficient of time is the percentage growth rate.

cyanide exports, although the ratio fell in later years. For many controlled items, the upward trend (approaching 0) means that the proportion of controlled exports to China makes up an increasingly large amount of total controlled exports to the World. Thermal exports from the UK follows this pattern, moving from -5.0 to -2.5 over the 1998–2015 period (this trend of China making up more of total exports to World is true in thermal exports from the United States and especially Japan as well, as Figure 4.2 more clearly shows).

I also inserted a vertical line at the year 2010 to allow visual inspection for any changes in levels of trade. In September 2010, the East China Sea disputes were touched off after Japanese coast guard ships collided with a Chinese trawler in disputed territory, and territorial disputes in the East and South China Seas have been ongoing ever since (also see Appendix B for details on China-related security events from US, UK, and Japanese government papers). Furthermore, after the Arab Spring in 2011, Western countries became aware that the surveillance technologies they had exported were being used by repressive governments—which is when controls on encryption technologies in particular came to the forefront. After 2010, one could expect the ratio of sensitive exports to China from the United States and especially Japan to fall given their geopolitical interests in the East and increasingly South China Sea.

Yet the data overall does not seem to indicate a steep drop in the ratio of controlled exports. Also, the increasing scrutiny over encryption-related exports does not seem to affect the categories of encryption exports in this sample in terms of a downturn, although the growth in exports may have leveled off somewhat.

Figure 4.1 Yearly Percentage Change in Ratio of Controlled Trade

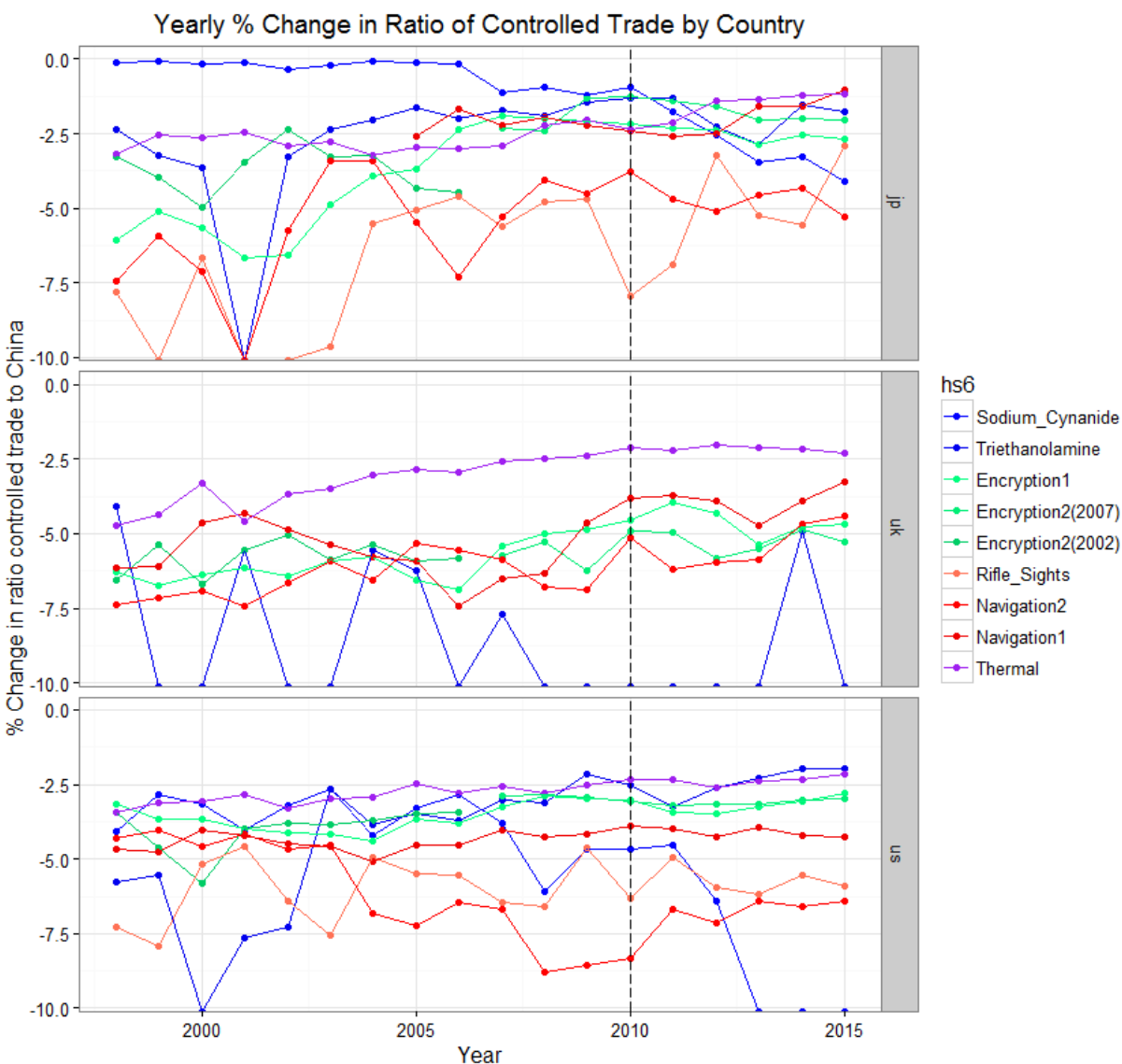
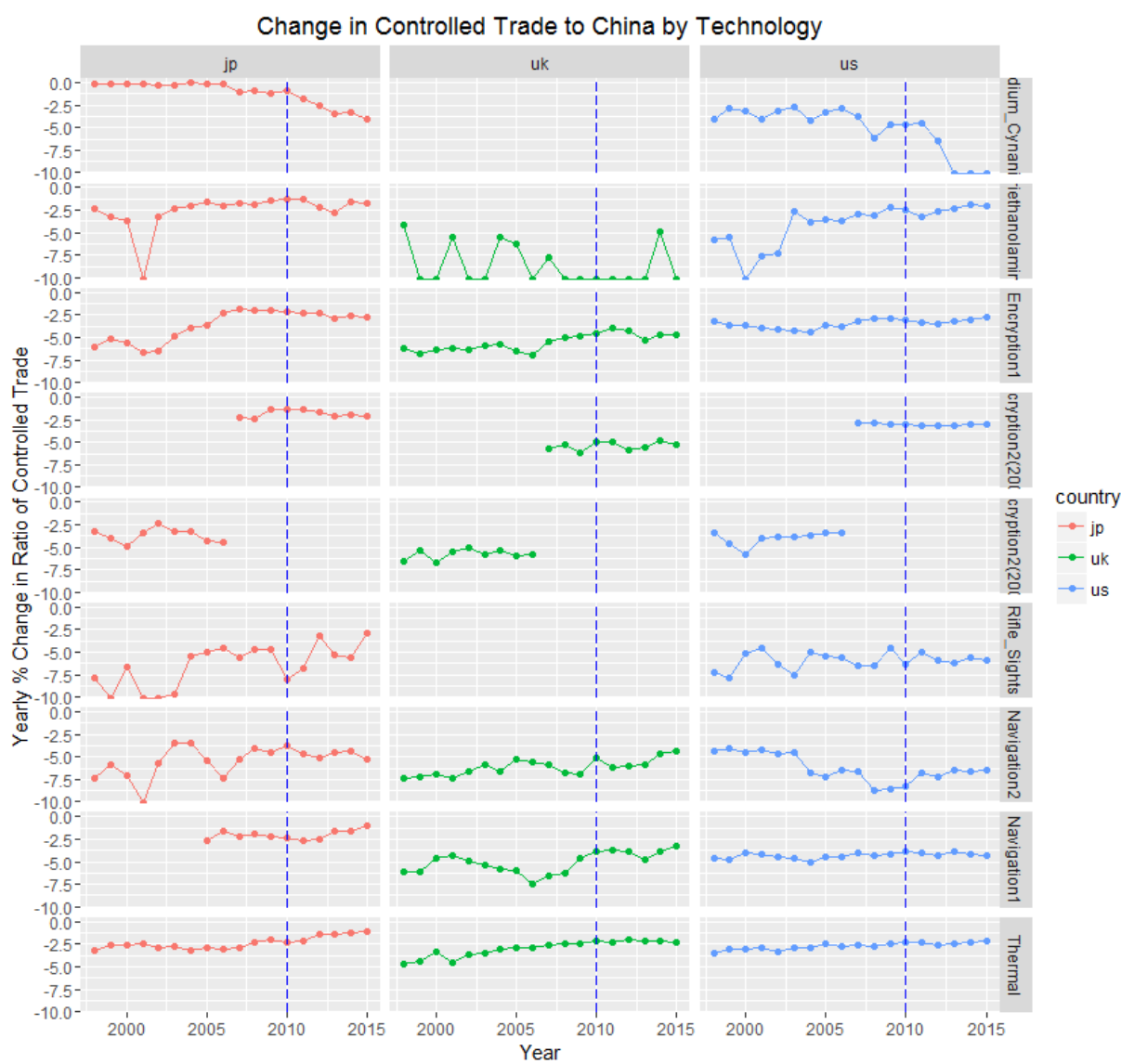


Figure 4.2 shows the same information in a different visual layout that offers a better view of the patterns in each technology (listed in the same order as the previous chart's legend). This figure also makes clearer the extent of missing data for exports to China due to the factors I discuss above. The values on the Y-axis are negative for the same reason as in the previous figure. In this plot, if you look vertically, you can see that within one country (color coded), the trends by technology varies, lending initial support for the idea that different types of controlled technologies

follow different trends in their export. If you look horizontally, you can also see that even for the same technology, the patterns across countries appear to differ somewhat. The ratio of sodium cyanide exports of China to World (top row) seems to be decreasing over time in both the United States and Japan, while thermal exports (bottom row) seem to follow a similar ratio and trend for all three countries, however. The year 2010 is also marked by a blue vertical line in these plots, yet sodium cyanide seems to be the only controlled export to China decreasing for all countries.

Figure 4.2 Yearly Percentage Change in Ratio Controlled Trade to China vs. World



Of the two plots below, Figure 4.4 shows the same information as Figure 4.2 but in a different format, whereas Figure 4.3 shows the yearly percentage change in controlled trade to China *not* standardized as a ratio of controlled exports to World. In Figure 4.3, the values on the Y-axis are positive, but as with the ratio, when the slope is negative, this represents a decrease in controlled trade to China, and when it is positive represents an increase in controlled trade. The bottom and top plots show similar trends, but depending on the country and technology, the effects are somewhat different—implying that in some cases, the trend in controlled trade to China diverges from the trends in controlled trade to the World.

Figure 4.3 Yearly Percentage Change in Controlled Trade

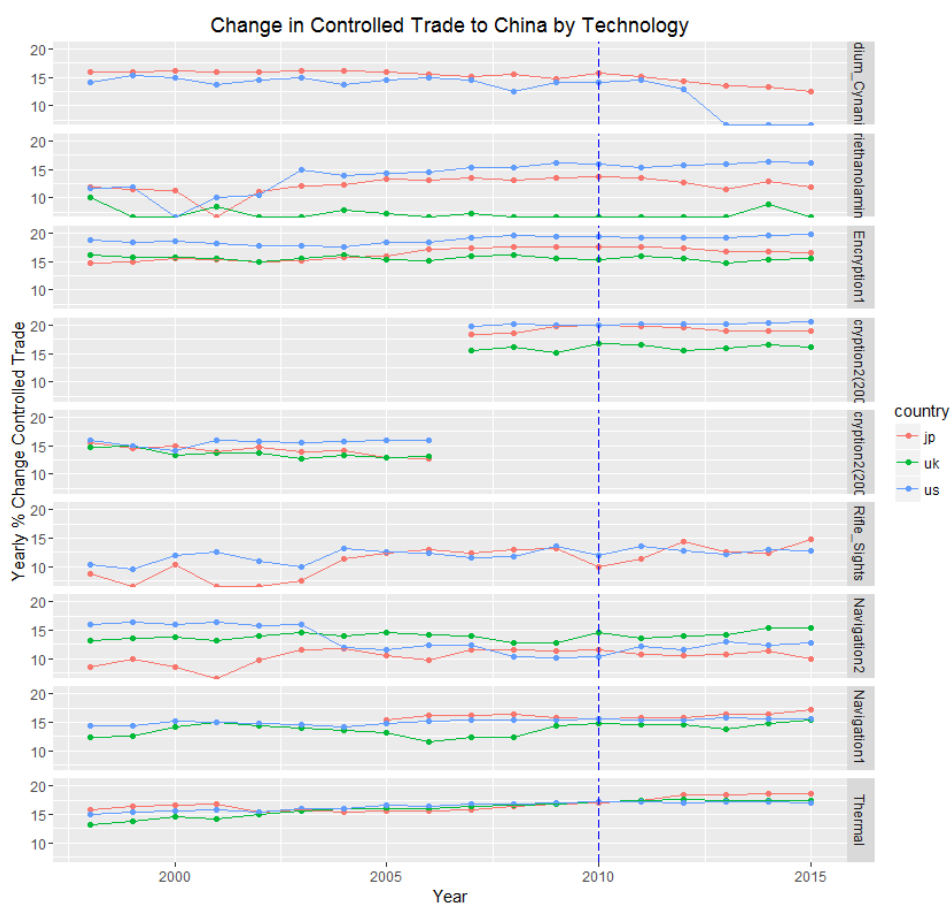
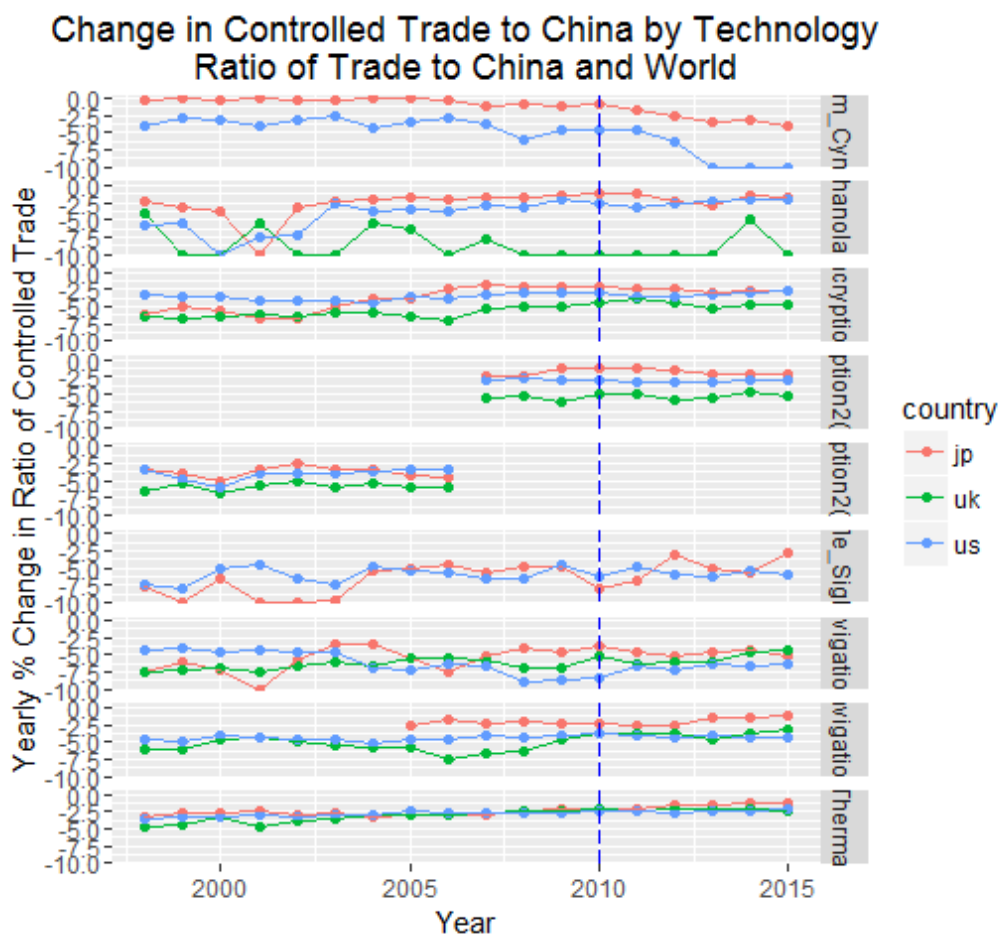


Figure 4.4 Yearly Percentage Change Ratio Controlled Trade



The preceding figures show evidence of a few points: besides exports of sodium cyanide from Japan and the United States, controlled exports to China do not generally seem to be decreasing after 2010. Furthermore, trends in exports vary not only by exporter, as can be seen in the different slopes of lines for the same technologies across countries (read across) in Figure 4.2. Trends in exports also vary by technology, as can be seen by reading Figure 4.2 vertically. That exports vary by technology within the same country suggests that the type of technology matters to decisions to export. It also means that it is worthwhile to investigate the technologies separately

rather than in an aggregate measure of controlled trade, which could mask important effects. In the next section, I move to my second research question of how to explain the variation I find in controlled exports.

4.2 RESEARCH QUESTION 2: WHAT EXPLAINS DIVERGENCE?

As I find evidence that even similar states implement export controls differently on the same dual-use items, I now attempt to see how much each of the individual explanatory variables in my hypotheses affect the outcome variable, controlled exports to a country of concern—specifically China.

4.2.1 Restatement of Hypotheses

I include Table 2.1 from Chapter 2 again below to reiterate the hypotheses for why we should see variance in controlled exports by country and by technology.

Table 4.1 Overview of Hypotheses (from Table 2.1)

	Type	Independent variable (IV)	Increases on IV - effect on controlled trade?	Varies by	Operationalization
Hypothesis 1	Realist	Perceived security threat	Negative	Exporter, time	Mention of importer in gov't papers, military expenditure or assume increasing over time
Hypothesis 2	Realist	Security threat of technology	Negative	Technology	Total threat or traditional military threat of technology (derived from ECN)
Hypothesis 3	Liberal	Trade dependence	Positive	Exporter, time	Trade dependence on importer or exporter's total trade dependence
Hypothesis 4	Liberal	Importance of industry	Positive	Exporter, time, technology	Industry exports/all exports
Hypothesis 5	Bureaucratic Politics	Defense agency involvement	Negative	Country	Qualitative assessment of low to high involvement
Hypothesis 6	Salience	Security threat type	Conditional	Technology	Type of security threat of technology (derived from ECN)

4.2.2 Operationalization of Independent Variables

In terms of the various ways to specify the realist and liberal hypotheses, some possible specifications pose concerns of multicollinearity with the dependent variable. For the first realist hypothesis (perceived security threat), generally speaking, China military expenditure should be a reasonable proxy for perceived China threat, at least for the United States and Japan. Yet whether represented as a proportion of China's GDP, or of World military expenditure, or in terms of year-on-year growth in the Chinese defense budget, one can expect China's military spending to be highly correlated with China's overall demand for militarily relevant dual-use goods, especially

controlled goods. Thus, we can expect China military expenditure to have a positive relationship with controlled exports to China, which runs counter to the realist hypothesis of greater China threat resulting in fewer controlled exports to China. I therefore need to find a better proxy to represent China threat that is not correlated with the dependent variable.

One option is simply to use time, as one could argue that the threat of China is increasing year on year, either linearly or exponentially, or I could include a dummy variable for before and after 2010—yet the graphs above do not seem to indicate that controlled exports fall after 2010. In the future, I plan to investigate a measure of “China threat” based on an analysis of US, UK, and Japan government white papers and how often and what kinds of China threat they mention.

Another issue to consider is how long after an increase in the perceived threat from China it takes to have an actual impact on licensing decisions. Theoretically, the impact on bureaucrat’s decisions could be immediate, but for actual changes to be reflected in government policy, regulations, or even recommendations may take longer.

Across technologies, the realist variable for “technology threat total” is a summation of the various possible types of threat a given technology can pose, which include Traditional, Multilateral, Human Rights, and Proliferation Threat, as I discuss further below. I measure the “traditional security threat” variable—which is an alternative specification of the realist technology threat—by whether the export poses a traditional military security risk based on the reason for control associated with the export control number (such as “national security”).

As for the liberal hypotheses, an exporter’s overall trade dependence may be somewhat correlated with controlled exports to China, particularly if China is an important importer (which it is for most countries). Yet an exporter’s trade dependence on China would be even more highly correlated with controlled trade to China, making the former proxy better, even if not ideal.

Across technologies, I determine the importance of the industry that produces the relevant technology to the domestic economy (“industry dependence”) through a rather complex procedure of finding the relevant North American Industry Classification System (NAICS) code, which the United States uses, for each HS6/10 code, then finding which ISIC code corresponds to the NAICS code, as ISIC is the international standard for industry codes where NAICS is only used in North America. Yet data for the latest revision of ISIC (ISIC Rev. 4) is not available, so these then had to be converted to ISIC Rev. 3.1 codes. I use the codes to pull data on the value added to GDP of industries that produce the different HS code products from the OECD STAN database. The same industries produce the thermal imaging and telescopic sights (STAN: C33 Medical, precision and optical instruments), but the other technology groups all fall under different industry codes. I calculate the industry dependence variable for each country by dividing the value added of the given industry by the annual value added of all industries. While there may be some correlation between size of industry and controlled exports to China, it should not be a direct relationship.

For the bureaucratic politics hypothesis, which involves the level of defense agency involvement, I simply code this variable as a 1, 2, or 3 for Japan, the UK, and the United States, respectively. These values reflect that Japan has historically had very little involvement from the MoD in its export control process, the UK has had more but still less than the United States, where the DoD has a strong imprint on militarily relevant export licensing decisions. The values derive from my discussion of the export control systems in each country in Chapter 3.

For the salience hypothesis, I need to know what kind of threat a given technology can pose because this interacts with issue salience and organizational essence. I label these threat types Traditional, Multilateral, Human Rights, and Proliferation Threat, and assign values from 0–2 each. (Thus for the “total technology threat,” which the realist hypothesis uses, the lowest possible

score is 0 and the highest possible score is 8, but my actual data ranges from 1 to 7 in total threat values.)

I assign the Multilateral Threat score based on whether the technology (HS6/10 code) is only under US unilateral export controls or multilateral export controls. Those under multilateral export controls may pose more of an “objective” security threat.

Human rights threat is more difficult to determine as the United States does not have an explicit way of identifying human rights threats—they should technically fall under the “Crime Control” category, but my knowledge of the technologies suggests that encryption and chemicals also pose human rights concerns due primarily to their use in the Middle East in recent years.

Finally, I determine the Proliferation Threat score by the “Nonproliferation” category associated with some export control numbers as well as my knowledge of whether they can be used for WMD. Appendix B further elaborates on the construction of the technology threat variables, provides their HS codes, associated ECNs, likelihood of control, and the security concerns associated with each ECN.

Below I provide a summary of my key variables and the possible methods for to operationalizing them.

Table 4.2 Operationalization of Variables

Type	Variable	Definition	Source
Controlled Exports to China (Dependent Variable)	controlled_xpts_ch	Value of annual exports to China of relevant HS-6 code	IHS Global Trade Atlas
Controlled Exports to World No China (DV/Control)	controlled_xpts_wd_no_ch	Annual Exports of controlled HS-6 code to World minus Annual Exports of controlled HS-6 code to China	IHS Global Trade Atlas
Technology Threat Total (Realist)	tech_threat_total	Sum of Technology Security Threat Type	Author qualitative Analysis
Traditional Security Threat (Realist)	tech_threat_trad	Military threat posed by technology (vs. WMD or human rights)	Author qualitative Analysis
China Military Expenditure (Realist)	ch_milex	China annual military expenditure in current [2015] USD (millions)	SIPRI Military Expenditure Database
China Military GDP (Realist)	ch_mil_gdp	Chinese annual military expenditures as percentage of GDP	World Bank
Overall Trade Dependence (Liberal)	xpt_dep	Exports of goods and services (% of GDP)	World Bank World DataBank - World Development Indicators
Trade Dependence on Importer (Liberal)	xpt_dep_ch	Ratio of exports to China over exports to World	UN Comtrade International Trade Statistics
Importance of Industry (Liberal)	industry_dep	Ratio of Industry Annual Value added of {ISIC code} / Annual Value added of all industries	OECD STAN database
Technology Security Threat Type (Salience)	tech_threat_*	Technological threat of the goods by type (multilateral, human rights, proliferation, traditional security threat)	Author qualitative Analysis
Defense Agency (Bureaucratic)	def_agency	Degree of defense agency involvement in export control licensing (1 = low; 3 = high)	Author qualitative analysis

In my dataset, some of the explanatory variables are time-invariant (namely, defense agency involvement and technology threat) while other variables only vary somewhat over time (industry dependence, overall export dependence). This invariability somewhat limits the leverage

I have with my data to explain changes in controlled trade to China. One way to address this issue in the future is to include more exporting countries in my dataset.

4.2.3 Realist Hypotheses

I begin by addressing the realist hypotheses, which expect that increased security threats either at the country or the technology level will lead to decreased exports to a country of concern.

***Hypothesis 1 (Realist):** The greater a country's perceived security threat from China, the fewer controlled exports to China*

First I plot of the relationship between time and controlled exports to China because I assume that the threat of China is increasing over the time period in my sample.

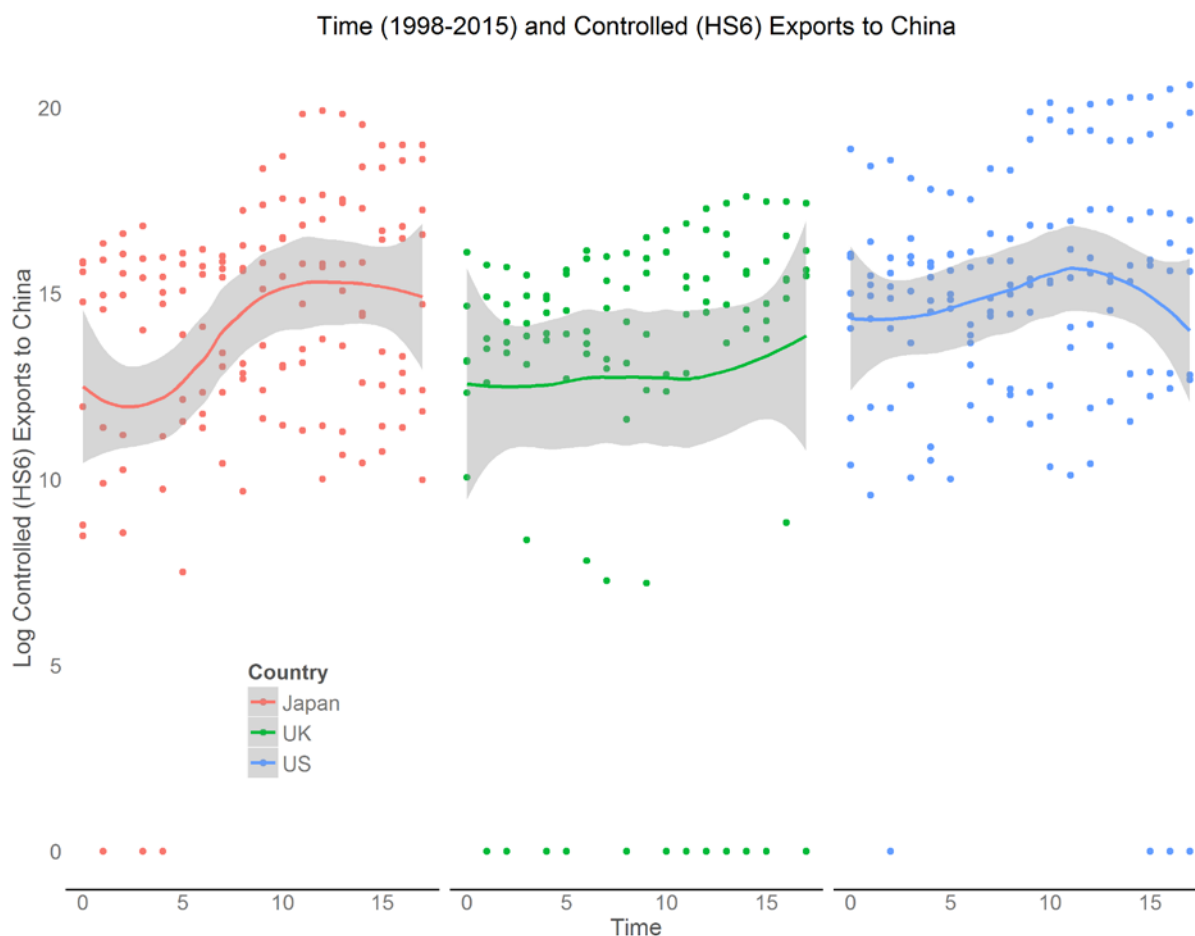
Figure 4.5 Time and Controlled Exports to China

Figure 4.5 shows the relationship between time from 1998 to 2015 (1998 being “0”) on the X-axis and the dependent variable, the natural log of controlled exports to China on the Y-axis. Logarithms are often a useful way to describe economic data because vertical moves of 0.01 equal a 1% change at any point on the Y-axis. The points are fitted with a LOESS curve, which is a method for fitting a smooth curve between two variables known as a “local regression,” with the 95% confidence interval shaded in gray.

Given that the perceived national security threat of China is high in the United States and in recent years Japan, we would expect the level of controlled exports to drop over time for these

countries. This figure shows that while in the UK (middle plot), controlled exports to China are slowly trending upwards, in Japan and the United States (left and right plot), they seem to have peaked and have been dropping slightly in recent years—yet there are many points both above and below the estimated curve for Japan and the United States.

At least two factors likely determine the shape of this curve over time—the increasing threat China poses, which should depress the curve, and the increasing economic importance of China, which should pull up the curve. The slight drop in recent years in the United States and Japan concurs with realist expectations, but the rather neutral slope overall suggests that economic importance has a major impact in the tug-of-war between economics and security in the United States and Japan. For the UK, which perceives little national security threat from China given its different geopolitical interests, exports increase over time. This trend would not surprise a realist.

***Hypothesis 2 (Realist):** The greater the security threat of the technology, the fewer controlled exports to any country of concern*

Figure 4.6 Total Technology Threat and Controlled Exports to China

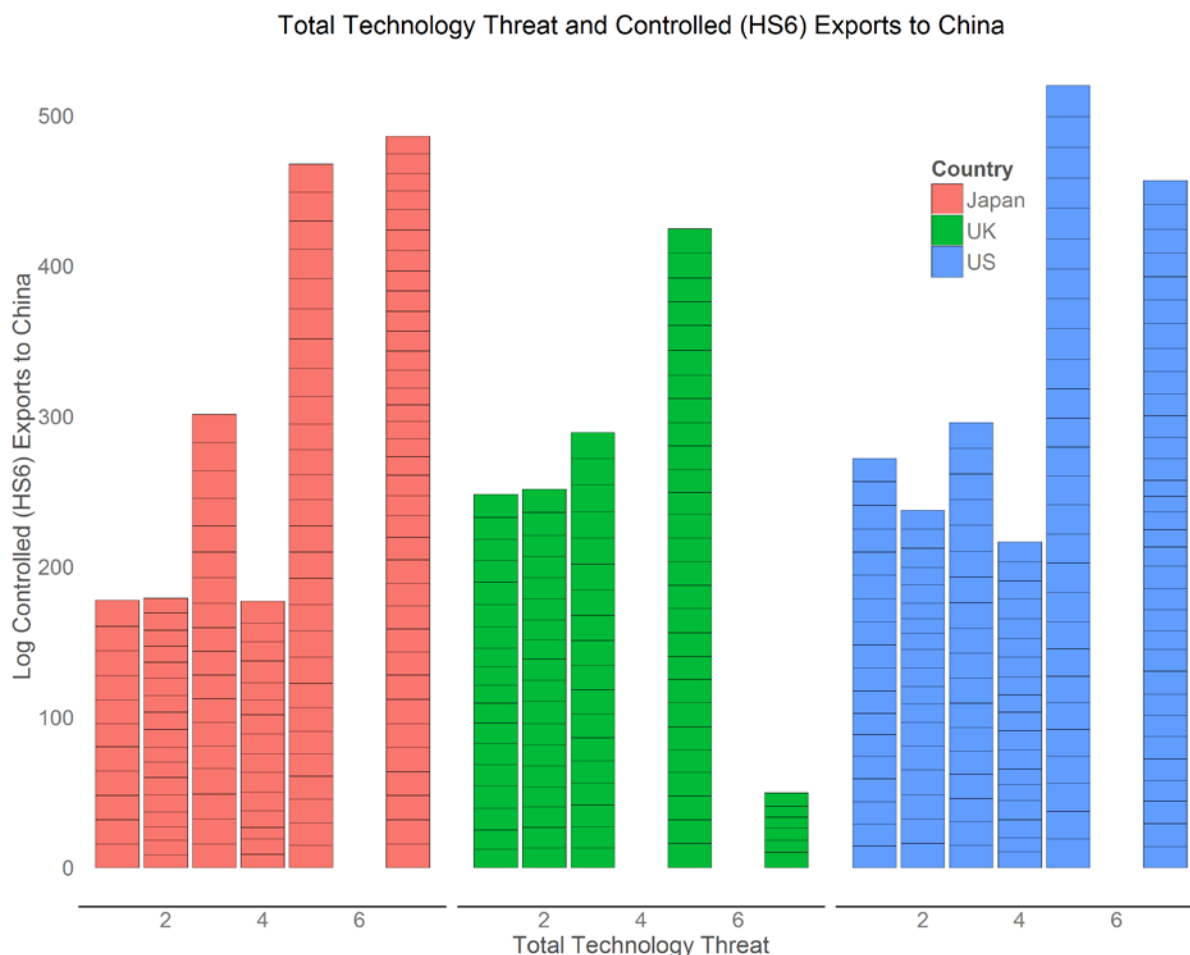
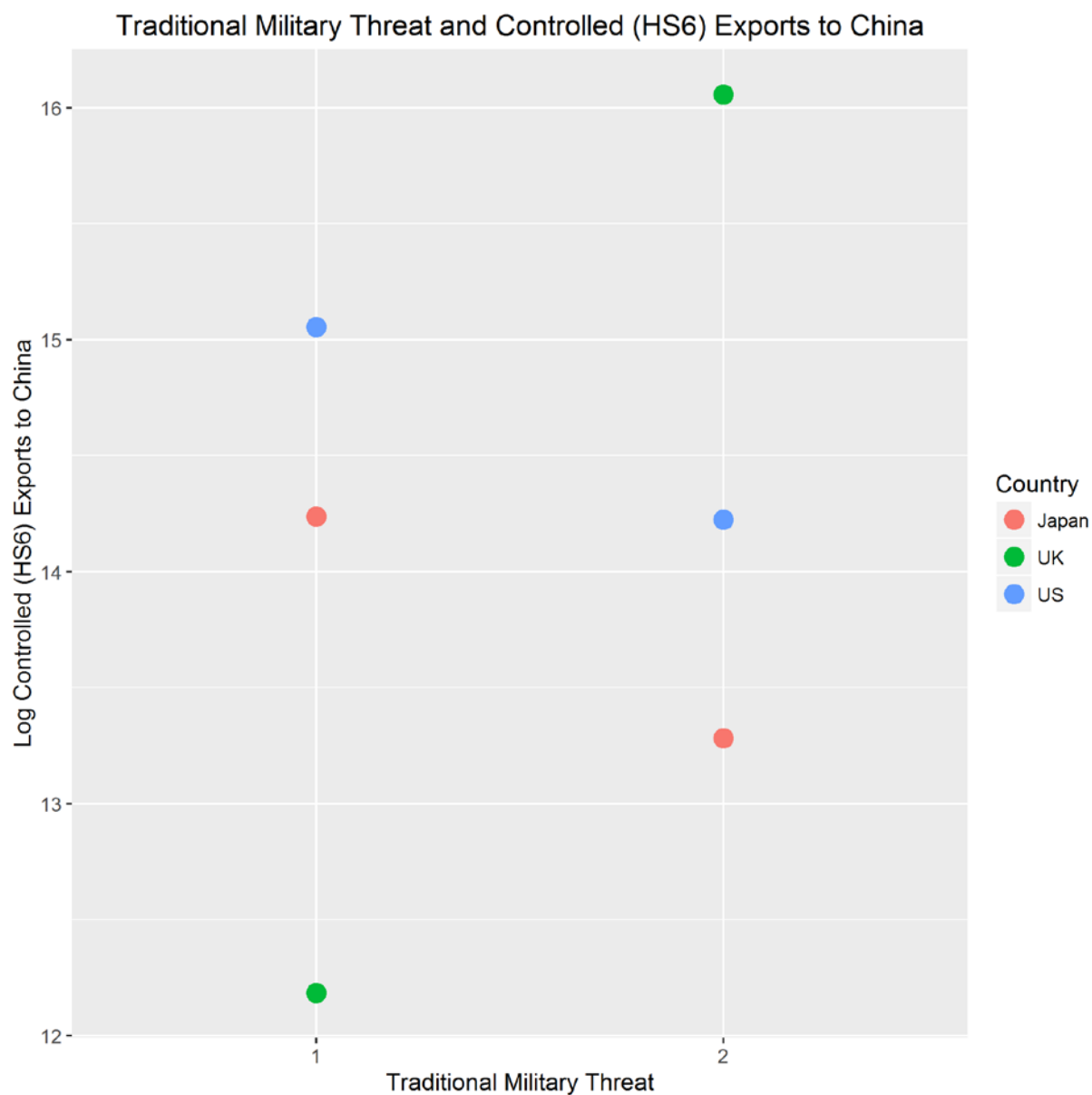


Figure 4.6 shows the relationship between the security threat of a technology operationalized as “total technology threat” on the X-axis, and the natural log of controlled exports to China on the Y-axis. This variable is the sum of values I assigned for the technology threat types (Traditional, Multilateral, Human Rights, and Proliferation Threat) using the procedure I described earlier. Combining the various possible types of technology threats offers a sense how “dangerous” the controlled technologies are that countries are exporting to China. It appears that in fact goods of greater technology threat are *more* likely to be exported, contra realist expectations. This could be because there are more dangerous goods than less dangerous ones, or because my sample is

biased toward more dangerous goods. Only does the UK seem to not export the most “dangerous” goods—but this has to do with them not publishing data on their chemicals exports to China. Also, total technology threat may not be an ideal proxy for the type of security threat realists care about—which is only existential threats to the state. Yet this data alone does not show support for the realist hypothesis that more dangerous technologies will not be exported.

Another way to test this variable would be to see if countries are exporting fewer dangerous technologies to China (or another country of concern) than to a safer destination of comparable size. While it is difficult to find a country that matches China’s importing power, Brazil or perhaps India could serve an interesting comparison, or the United States, Europe, and Japan’s exports to each other.

Figure 4.7 Traditional Military Threat and Controlled Exports to China

While Figure 4.6 looked at total technology threat, Figure 4.7 shows the relationship between the security threat of a technology operationalized as “traditional military threat” on the

X-axis and the natural log of controlled exports to China on the Y-axis.⁴⁹ Traditional military threat is coded from low to high as 0, 1, or 2, and is an alternative way to test the realist hypothesis on the security threat of a technology. The countries appear by dot color.

The graph shows that the UK versus the United States and Japan follow different patterns of exports—the UK exports relatively more traditional military threat items to China, as expected, because China does not pose a direct military threat to the UK. The United States and Japan both export fewer items the higher they rank on traditional military threat. This figure suggests that increased military security threat of a technology does indeed diminish quantities of controlled exports for countries that view China as a potential military threat (the United States and Japan). Yet of the sample data, only thermal and telescopic sights technologies rank a “2” on traditional military threat, and the UK does not release data on its telescopic sights exports, meaning the high value for the UK is coming only from thermal technologies. Adding more militarily relevant technologies to my sample could help overcome this issue and provide a more robust test for this hypothesis.

4.2.4 Liberal Hypotheses

Now I turn to the two liberal hypotheses, which focus on economic explanations for controlled trade, specifically trade and industry dependence.

Hypothesis 3 (Liberal): *The greater a country’s trade dependence, the greater controlled exports*

⁴⁹ Unfortunately, the sample is too small to effectively include the error bars in the plot

Figure 4.8 Export Dependence and Controlled Exports to China

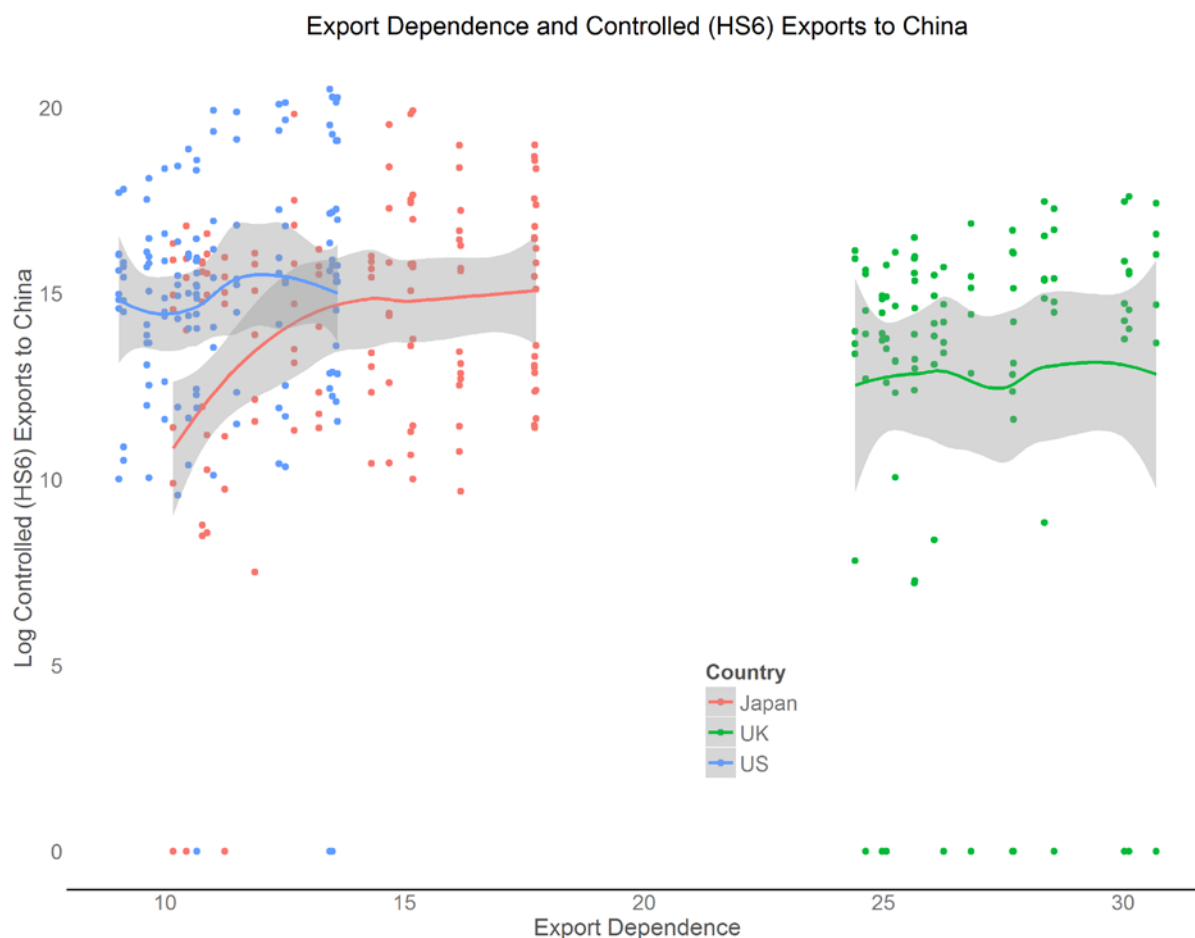


Figure 4.8 shows the relationship between export dependence, which is exports of goods and services as a percentage of GDP on the X-axis and the dependent variable, the natural log of controlled exports to China on the Y-axis. In the liberal hypothesis, increased export dependence should lead to increased controlled exports to China. While each country has a different range of export dependence (lowest for the United States, highest for the UK), it seems that export dependence has either a neutral or small positive effect on controlled exports to China. Japan's export dependence appears to have the most positive relationship with controlled exports, which may indicate a heightened sensitivity to economic considerations in Japan versus the United States

or the UK. The neutral slopes for the United States and the UK do not support the liberal hypothesis on trade dependence, however.

Hypothesis 4 (Liberal): *The more important to the domestic economy the industry producing the controlled technology, the greater controlled exports*

Figure 4.9 Industry Dependence and Controlled Exports to China

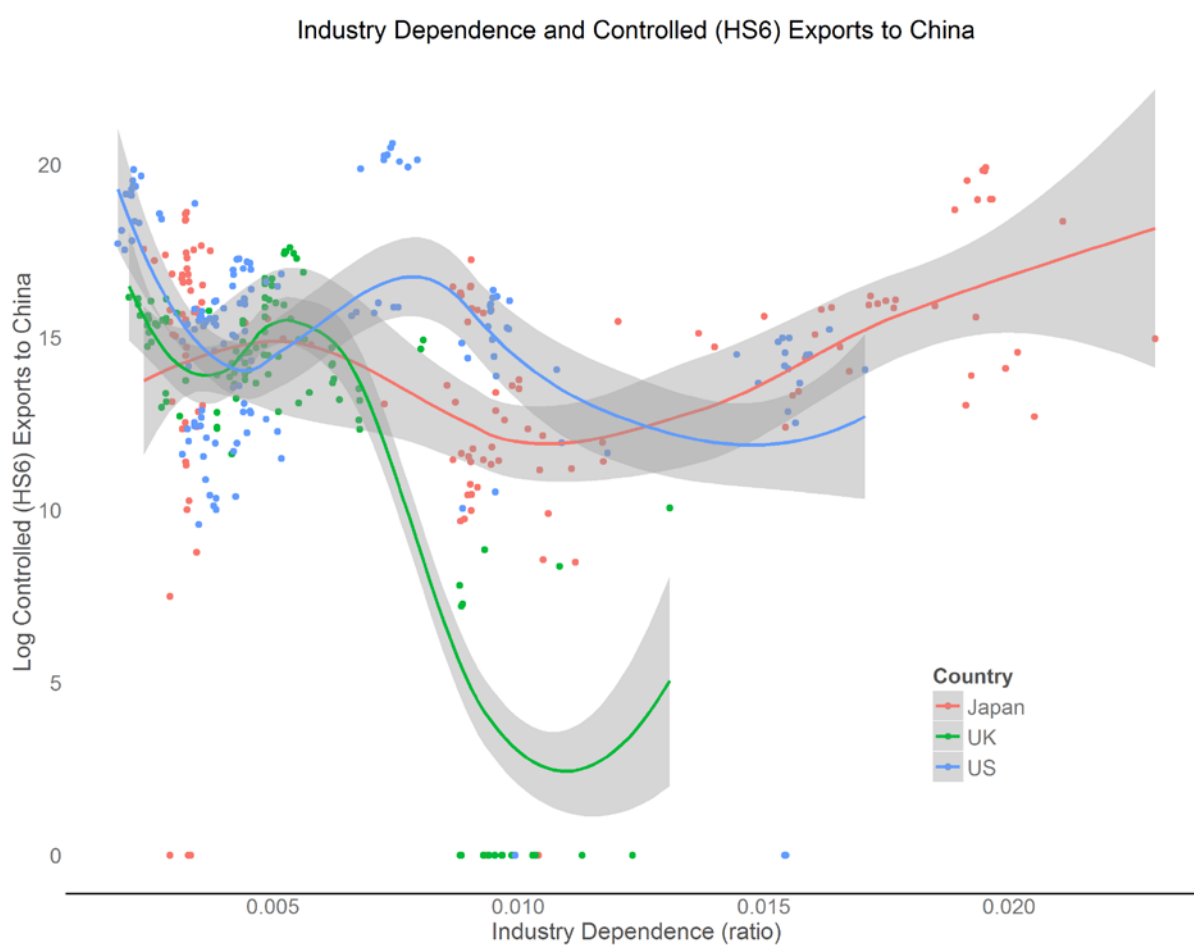


Figure 4.9 shows the relationship between industry dependence, which is a ratio of industry value added for the industry that produces the relevant controlled technology divided by the annual value added of all industries in a country, on the X-axis, and the natural log of controlled exports

to China on the Y-axis. According to the liberal hypothesis, the greater the industry dependence, the greater the volume of controlled exports should be. The data, however, do not seem to bear out this relationship, as the change in controlled exports as industry dependence increases is not linear and appears random. Thus, I have not found strong support for either of my liberal hypotheses about the impact of economic considerations on controlled trade.

4.2.5 Bureaucratic Politics Hypothesis

Hypothesis 5 (Bureaucratic): The greater a country's defense agency involvement, the fewer controlled exports to any country of concern (including China)

Figure 4.10 Defense Agency Involvement and Controlled Exports to China

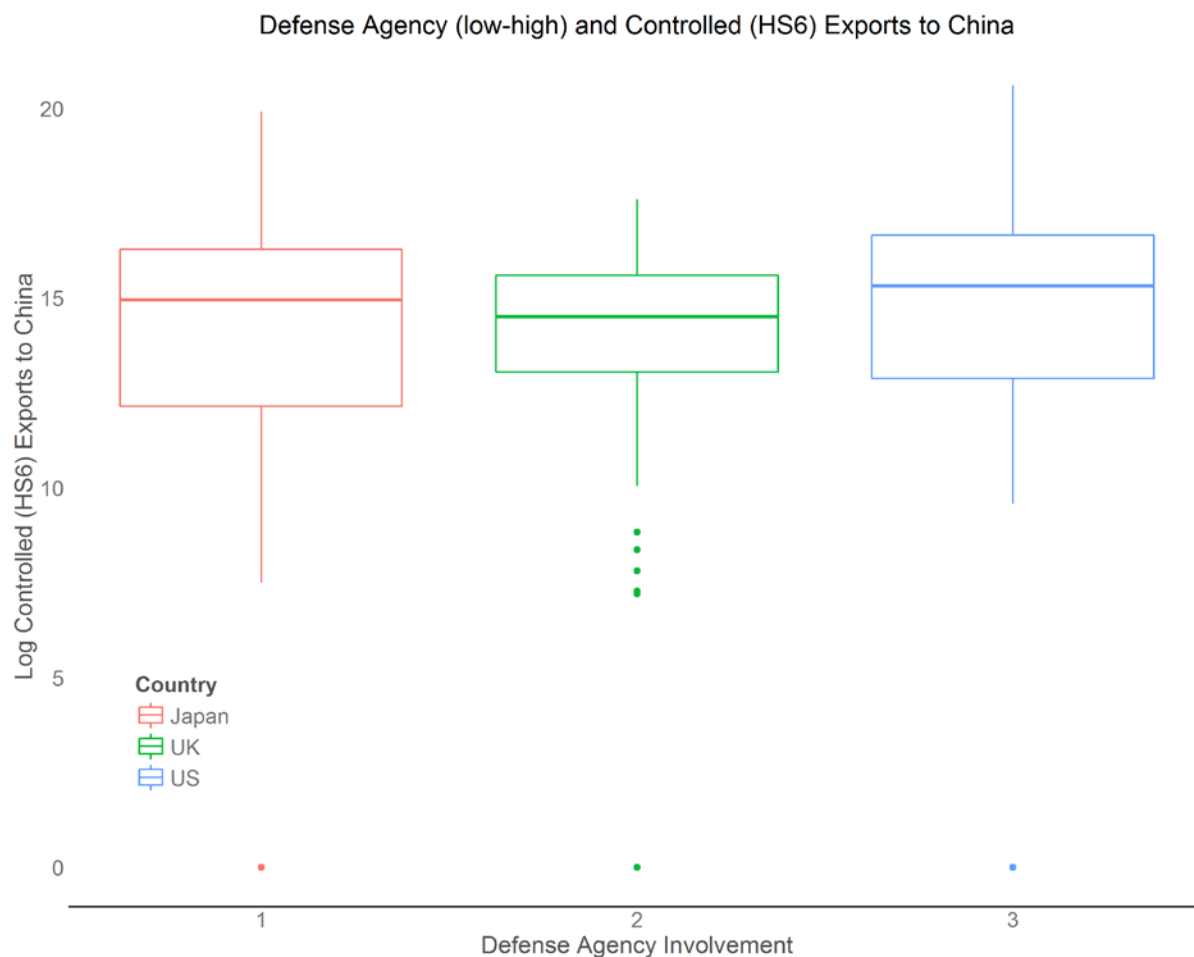


Figure 4.10 shows the relationship between defense agency involvement on the X-axis and the dependent variable, the natural log of controlled exports to China on the Y-axis. I assigned these values, which range from low defense agency involvement for Japan to high defense agency involvement for the United States (from 1 to 3), to test the bureaucratic hypothesis that increased defense agency involvement should depress the amount of controlled exports to China. The graph shows that the mean (horizontal bar) is slightly higher both Japan and the United States than for the UK. This makes sense because they export more controlled goods to China overall given that their economies are larger.

Given how tall the boxplots are and their overlap, however, they do not provide much support for increased defense agency involvement leading to decreased total exports to China. This is likely because defense agency involvement is perfectly correlated with the country as the data stands right now, and suggests that I need to find a way to tease out the independent effect of defense agency participation in the export control process that is unrelated to the country itself. This data alone does not provide evidence for the bureaucratic politics hypothesis.

4.2.6 Saliency Hypothesis

Finally, I address my saliency argument using quantitative methods and interpret the results based on my discussion of the bureaucracies and issue saliency by technology I discuss in Chapter 3.

***Hypothesis 6 (Saliency):** The type of security threat of the technology matters to export. Namely, the greater the human rights threat of the technology, the less likely UK is to export to China. The greater the traditional military threat of the technology, the less likely United States and Japan are to export to China.*

While it is challenging to show the effect of a conditional mean on the dependent variable using descriptive statistics, my goal is to explore whether the type of technology threat makes a difference to the level of controlled exports by country. Since I am testing the countries as the independent variables, I take as given these features of agency involvement in each country (discussed in Chapter 3): the foreign affairs agency is an active participant in the export control process in the UK, as is in the United States, but in Japan is not heavily involved. Defense agency involvement is high in the United States, medium in the UK, and low in Japan.

I select two of the technology threat types that are more salient for the countries in my sample with regards to their exports to China—namely, human rights and traditional military threats. Given that the Chinese government has engaged in many well-publicized human rights abuses, the more a technology activates human rights concerns, the less we would expect countries export to China *if* 1) human rights concern about China is a major issue for them and 2) the foreign affairs agency is involved in the export control process. We would expect the United States and the UK to restrict exports of technologies that pose a human rights threat while Japan should export them as normal.

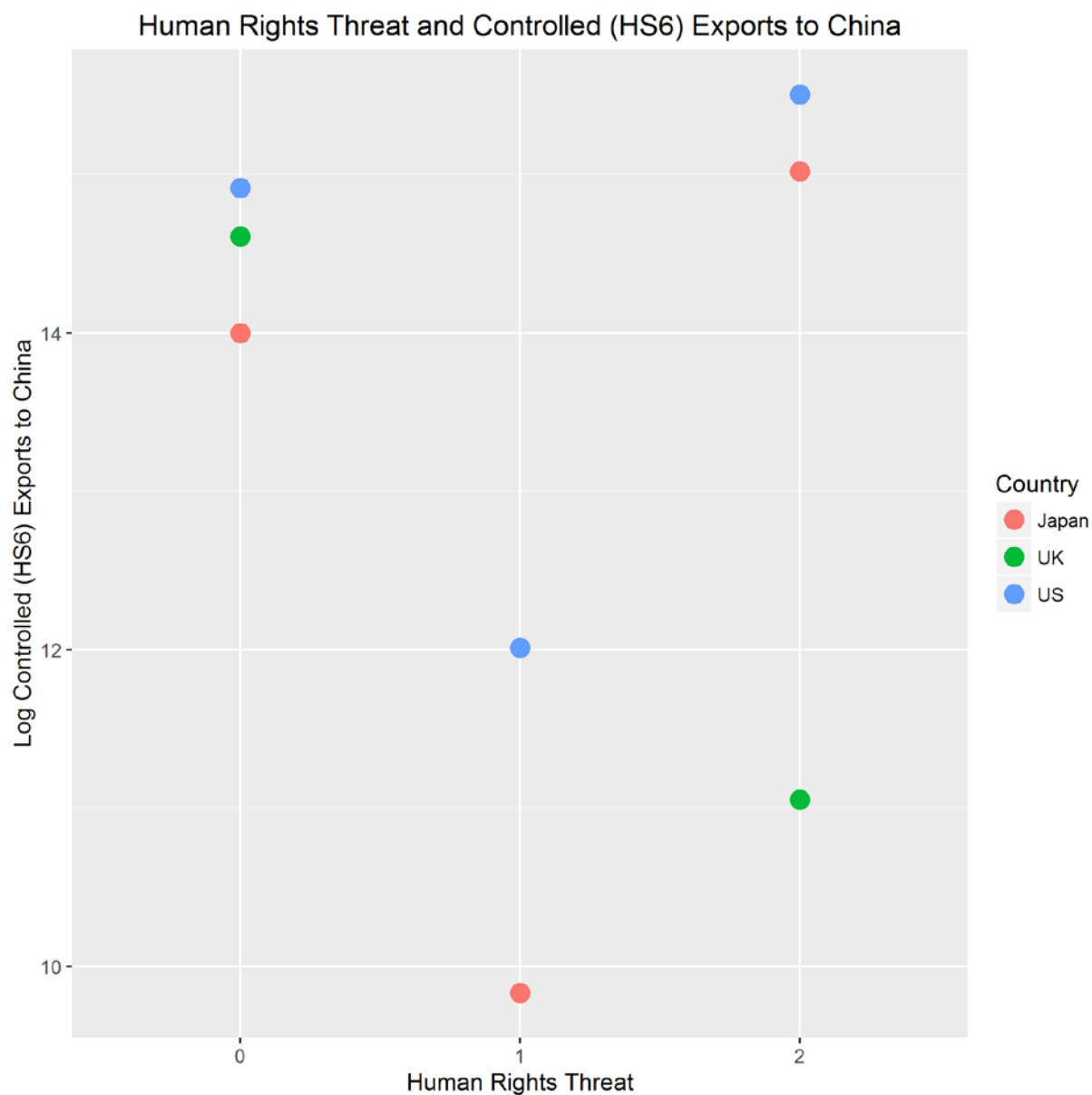
Figure 4.11 Human Rights Threat and Controlled Exports to China

Figure 4.11 shows the relationship between the human rights threat a technology poses, which is coded from low to high as 0, 1, or 2, on the X-axis, and the natural log of controlled exports to China on the Y-axis. The countries are by dot color. This figure indicates that the United States and Japan are willing to export even technologies that pose an important human rights threat

(encryption and chemicals), but not the UK, which exports a relatively higher amount of technologies that do *not* pose a human rights threat. This finding thus partially supports the salience hypothesis because the UK restricts exports as expected. Yet the United States claims to make human rights considerations a major foreign policy goal *and* the State Department is part of the export control process, yet we still see many exports of technologies high on the human rights threat scale to China. This result may stem from the State Department indeed caring about human rights, but not with regards to China specifically.

As for the traditional military threat of a technology, given that the Chinese military is growing and has been more proactive in recent years, the more a technology activates traditional military concerns, the less we would expect countries export to China *if* 1) military threat from China is a major issue for them and 2) the defense agency is involved in the export control process. A salience approach expects the United States to restrict exports of technologies that pose a military threat while the UK, which does not view China as a military threat, should export them as normal. Meanwhile, although Japan views China to be a military threat today, even if exports should activate a salient concern, the lack of defense agency involvement means no one will be there to filter the concern into the export control process. Thus, Japan will continue to export militarily sensitive technologies to China as normal.

The findings from the second realist hypothesis, shown in Figure 4.7, indicate that the country with the greatest defense agency involvement *and* that views China as a military threat (the United States) does export fewer highly militarily relevant technologies, as expected. The UK exports the greatest amount of highly militarily relevant technologies, and this is also expected because China is not a salient military concern for the UK. Japan, however, despite having little defense agency involvement in its export control process, exports low levels of highly militarily

relevant technologies, like the United States. Thus, while the predictions of the salience argument are not completely wrong, the direct military threat of China may more simply explain levels of militarily relevant technology exports.⁵⁰

The support for the salience hypothesis is therefore mixed. It might be that salience arguments matter more for some technologies than others. For example, when it comes to exports that impinge on national security, little filtering through bureaucratic missions may occur, but when the threat is normative or intangible (as with human rights), the filtering mechanism (which agencies are involved in the export control process) may become more important.

4.3 CHAPTER SUMMARY

In this chapter, I discussed my data collection and how the hypotheses relate to the data I have collected. Through descriptive data analysis, I find evidence that practices in export controls vary not only by country but by technology. I explicate these differences by exploring the relationship between the key independent variables in my analysis and the dependent variable, controlled exports to China. While I am not able to come to a conclusive finding on the drivers of differences in export controls, the data suggests that many of the independent variables do not appear to have the impact on exports as one might expect given the hypotheses.

For the realist hypotheses, perceived China threat alone only has a weak negative relationship with controlled exports, but the military specific threat a specific technology poses appears to have a stronger negative relationship with exports. The liberal hypotheses relating to export dependence at the country level or industry dependence at the technology level do not

⁵⁰ I provide the results of the Proliferation Threat variable in Appendix B for reference, although I do not have a hypothesis about how the issue salience of proliferation should affect exports in each country.

appear to have a direct correlation with controlled exports to China. The bureaucratic politics variable—defense agency involvement—is hard to parse given that it is collinear with the country variable, but I do not find evidence to support it with the current data. The salience variable finds mixed results and suggests that we may not need to add an additional salience dimension at least when it comes to national security concerns.

The strongest conclusion of this analysis given the data is that surprisingly, neither of the liberal variables seem to impact controlled trade in the way one would expect them to. We have some evidence for the realist variables mattering, no evidence for the bureaucratic politics, and mixed evidence for the salience approach.

Chapter 5. CONCLUSION

The puzzle driving this study was why similar countries practice export controls on the same technologies differently, despite the potentially negative consequences to all parties of doing so. In this chapter, I address my theoretical and empirical contributions, possible extensions, and offer a short discussion of the future of export controls that draws on the issues I discussed in the Introduction.

5.1 THEORETICAL AND EMPIRICAL CONTRIBUTIONS

The first research question I addressed was whether countries indeed practice export controls differently, and I found evidence in my research and quantitative analyses to suggest that this is the case—at least with regards to exports to China. Variation exists not only between exporting countries but also within them among different technology groups. China is a major importer as well as a security threat, and from an export control perspective it is worrisome that states inconsistently manage sensitive technology transfer to this destination.

This first finding on inconsistency in export control practices among similar countries casts doubt on the effectiveness of the multilateral export control regimes. The regimes may not be able to mitigate the Prisoner's Dilemma and overcome states' narrow interests in pursuit of their more diffuse goals of international security and nonproliferation.

The second research question is what explains the variation I find among countries and technologies in controlled exports to China. In Chapter 2, I draw on a broad literature in international relations to address this question. From the theoretical perspective, I engage realist,

liberal, bureaucratic politics, and political psychological perspectives on dual-use trade. I also offer a political psychology perspective which is my theoretical contribution to the export control field. My argument is that a bureaucratic lens filters national-level issue salience. Then specific technologies activate certain concerns.

I derive six hypotheses based on my theoretical discussion in Chapter 2, which I later test. I also show how my focus on dual-use exports fills an important gap in the trade and conflict literature in IPE, and discuss how my work builds on existing empirical studies on dual-use export controls. My methodology for deriving my five technology types refines and advances previous work in this field.

Chapter 3 provides a history of the export control systems of the three exporters in my study, the United States, the UK, and Japan. I also discuss the bureaucratic structures in each country and how each state applies export controls to China specifically. Finally, I provide background on my five technology group cases. The background in this chapter provides evidence for the bureaucratic politics and salience explanations that I test in Chapter 4.

In Chapter 4, I use the dataset I created for this study based on public and proprietary data to test my two research questions. I begin by assessing controlled exports across technologies and countries and show evidence that they vary on both dimensions. We do not see a noticeable drop in all controlled exports to China after 2010, when security incidents came to the forefront. The differences across controlled technologies suggest that it is important to not only disaggregate trade into commodities and strategically important items, but also to look at the differences in trends within specific technology groups.

I then test my six hypotheses for the variation I identify across countries and technologies in controlled exports. The realist, national-security focused hypotheses find some support,

although perceived China threat alone only has a weak negative relationship with controlled exports. The military threat a specific technology poses has a stronger negative relationship with exports for countries that view China as a military threat. The economics-focused liberal hypotheses relating to export dependence at the country level or industry dependence for specific technologies do not appear to have a direct correlation with controlled exports to China.

My qualitative analysis and fieldwork, which I presented in Chapter 3, suggest that bureaucratic politics play a major role in the export control process, even outside the United States. Yet in Chapter 4, I do not find evidence to support the bureaucratic politics variable, defense agency involvement. Unfortunately, data limitations may drive this non-finding. The salience hypothesis finds mixed support and suggests that we may not need to add an additional salience dimension when it comes to technologies that activate national security concerns.

I hope to collect more quantitative data based on my knowledge of the export control process to further test the bureaucratic politics and salience arguments. With less than 500 observations in my current dataset for five technology groups, getting leverage on these hypotheses is challenging, so including more importers or exporters will allow for a better test of my salience argument. With a larger dataset and careful analysis, the inclusion of factors specific to the exporting country, such as bureaucratic structure, and others specific to the controlled technologies may provide a greater level of insight than economic and security considerations alone can.

In Chapter 2, I detailed my data collection procedures for controlled technologies and in Chapter 4, discussed how I specified my variables along with their data sources in the hopes that other researchers in the export control field can replicate my steps. My data and methods can further our understanding of this important security policy area. Although the hypotheses I derived from the theoretical literature have not yet fully explained the outcome of variance in controlled

trade to China, I believe further developing these hypotheses is valuable. *This exercise is particularly valuable if it turns out that variables other research has shown should matter to the outcome, such as the economic considerations, actually do not matter as much as we think.*

5.2 POSSIBLE EXTENSIONS

Many options exist for improving upon and extending my work, which I have considered while working on this dissertation and in my discussions with other researchers. Below I discuss the most pertinent and feasible extensions to my work.

An obvious way is to include more importer and exporter countries. Importer countries are easier to include, but increasing these may be less substantively interesting as most countries of concern do not receive many controlled exports. It could be enlightening to check if low levels of controlled exports indeed exist for all importer and exporter pairs, however. But including more exporter countries is a more challenging exercise due to language barriers in data collection.

Collecting trade data is not difficult, but gathering data on all of the other potentially relevant independent variables in a foreign language is. Within the EU this might be relatively easy, or for Canada or Australia, but broadening out to non-Western countries will be a challenge without a native speaker and expert's assistance.

I plan to begin by including France and Germany into my analysis, which I had originally intended to do, but could not for this dissertation due to resource limitations. These countries are important NATO allies and producer states, as well as major arms exporters. In my study, I controlled for US pressure by including two of the United States' closest allies, the UK and Japan. Yet France and Germany are less susceptible to US pressure. Thus, including them could be a way of assessing US influence on the export control process as previous export control studies have

attempted to do, including Mastanduno's work on CoCom (1992) and Fuhrmann (2009) on civilian nuclear assistance. Previous studies have emphasized that alliances affect export control decisions, so we can expect France and Germany's licensing decisions to diverge even more from the United States' decisions more than do those of the UK or Japan.

Another way to extend this study is to include more technology categories. I would have to include technologies that are not major exports from all three of the United States, Japan, and the UK, but this could be acceptable if I also extend the number of exporting countries to allow a large enough basis for comparison. More technology categories would allow for better hypothesis testing, particularly of my salience argument.

As I discussed in Chapter 2, I would also like to find a way to incorporate political drivers, such as technology transfer agreements, changes in government, or legislative or bureaucratic reform into my analysis. In particular, major reforms have taken place in the United States, the EU, and Japan in recent years.

A question I addressed in my dissertation is how important economic factors are to export control decisions. I found that the greater export dependence and industry dependence do not lead to more controlled exports. Yet broadly speaking, economic factors invoke questions about the character of the relationship between industry and government in the export control processes. My interviews suggest the government-industry relationship is different in the United States, the UK, and Japan, with the United States having the most antagonist relationship with industry and severe penalties for export control violations. Although my economic variables did not explain the outcome in controlled exports in my sample, we should still consider the differences in how much value states place on economic competitiveness and growth and other ways they might affect export control decisions.

The first elements of US Export Control Reform, proposed in 2009, came into effect into 2013, and reform is still ongoing. Being the first major reform in the US export control system since 1979, when Cold War concerns were still the main driver of export controls, it would be fruitful to assess the impact on US multilateral obligations to the export control regimes and whether US practices fall more or less in line with other regime member countries. Given that the end goal is a more streamlined system, a bureaucratic politics approach would expect changes in the United States' especially complicated bureaucratic structure to bring US export control practices closer to those of other advanced countries. Liberals and realists, however, would not expect practices to change much.

In the EU, 2009 saw revamping of both the dual-use export control regime (Regulation (EC) No. 428/2009) and Directive 2009/43/EC on intra-EU-transfers of defense-related products. These new rules may have increased harmonization in the EU, but they may not have, or the UK may take a different position to the EC regulations compared to the continental states of France or Germany. Researchers in the EU are currently assessing the degree of coordination in export controls among EU member states, and may be able to apply some of the methods I use in my study.

Japan for the first time in nearly half a century is now able to export arms, and the MoD should also be taking a greater role in defense-related exports, including of militarily sensitive dual-use technologies. Given Jones' (1999) findings on the role of the defense agency in restricting exports, we might expect Japan to become more cautious about exporting controlled goods to countries of concern.

Coincidentally, German defense agency involvement in its export control process has dropped in recent years, making for a potentially interesting comparison between these similar

producer states. A bureaucratic politics approach expects Japan to move toward more careful scrutiny of militarily relevant items in exports to all countries, while Germany should have laxer scrutiny. As with US Export Control Reform, realists and liberals would expect no difference from the structural changes in Japan and Germany.

Several of my interviews and talks also broached the role of intelligence, the intelligence agencies, and overall security awareness in the export control process. Japan severely lacks in intelligence gathering and analysis capabilities relative to the United States and the UK. This could impact Japan's ability to make an accurate assessment of the security situation when deciding whether to export a controlled technology. Yet having worse intelligence does not necessarily mean we should expect laxer export control practices, as those states with weaker intelligence tend to rely on those with stronger intelligence.

The psychological principles of availability and salience I discuss in Chapter 2, however, suggest that not possessing direct information of the ways in which an importer might use or misuse an export could lead to less concern among licensing officials than had they been privy to that information. In future analyses, I could add intelligence agency or capacity as its own independent variable, find a way to fold it into my bureaucratic politics explanation, or structure it into the salience argument.

A topic related to intelligence gathering is to pursue further how important concerns about an export making a direct military contribution are to licensing decisions, compared to concerns that the importer does not have adequate export controls. Some of my interviewees expressed concerns about internal diversion, or "diversion-in-place," for controlled exports. An example is controlled machine tools legitimately exported to a civilian user that the military takes over at

night. External diversion to third countries is another concern, such as when a North Korean entity receives a controlled good intended for China.

Internal diversion represents something about the threat characteristics of an importer, while inadvertent external diversion is more of a statement on the capacity of a country to control its own exports. For example, the United States might forgo export of a controlled technology to Malaysia not because it sees Malaysia as a potential security threat, but because it is concerned about the illicit trade flows that have gone through that country. If I expand my sample to include other importing countries, the risk of diversion as an export control licensing factor will become more important to consider. It is also possible that some of the licensing decisions to restrict exports to China were not due to a perceived threat from China per se, but because its export control system is still developing.

Finally, another research question for future attention is how much the challenge of regulating the export of a dual-use technology affects export control implementation. For example, nuclear technologies are among the easiest to regulate due to their limited number of producers and a consensus on their threat, while encryption technology due to its mass production, intangible nature, and lack of consensus on threat is one of the hardest. Thus we might expect that countries do not implement encryption export controls as rigorously as nuclear technology controls, whether intentionally or simply because they are difficult to apply.

One way to approach this question could be to compare implementation on controls of tangible versus intangible technologies. Another way would be to see how WA-controlled dual-use exports vary compared to exports controlled by the other three multilateral export control regimes, although nuclear and chemical controlled exports in particular are likely to follow their own logics due to the different national and international regulatory regimes that cover them (such

as the Department of Energy in the United States for nuclear technologies or the CWC for chemicals). The more types of technologies I am able to include in my analysis, the better I will be able to address how much the challenge of regulating the export of a dual-use technology affects export control implementation.

5.3 LOOKING AHEAD

The future of export controls is bleak, for reasons I first broached in the Introduction and also due to the variation we see across states in their implementation of export controls. The development and heightened security implications of intangible technology, including 3D printing, alongside increasing foreign availability of controlled technologies means that it is much more difficult for producer states to keep dual-use items from getting into undesirable hands.

States today face no clear enemy. The focus of export controls, particularly under UN Security Council Resolution 1540 (2004), has shifted from containment of the enemy bloc toward proliferation and non-state actors. It has also moved from keeping clearly defined, militarily relevant technologies away from enemies toward protecting the human rights of people under oppressive governments. Although states are attempting to control exports for human rights purposes, as noted in my interviews, the justification they make at WA must be military because there is nothing in the initial elements that allows control for human rights reasons.

One intermediate solution is to better employ so-called catch-all controls, which provide a legal or regulatory basis for the export of sensitive items when there is reason to believe such items are intended for a WMD end-use or end-user. Catch-all controls focus more on the nature or threat of the recipient than the specifications technology itself. Increased emphasis on country and individual exporters of concern may help with some of the challenges evident in regulating the

export of items, especially intangible ones. Catch-all controls rely a great deal on exporter awareness of dangerous end-uses or users, however. Also, whether various countries will be able to agree to a common list of “importers of concern” is an open question.

My study has shown evidence of disconcerting variation in export control licensing even among similar producer states. This suggests that even among like-minded countries, states cannot not be satisfied with coming to a consensus on control lists at the multilateral level, but also have to consider how to coordinate domestic implementation of agreed-upon rules better.

Continuing to characterize the implementation of export controls as a battle of economics versus security will not help in understanding state practices. I find that security concerns do seem to matter to export control practices, but we must also investigate other explanations, such as why certain technologies receive more attention from domestic agents than others.

In my dissertation I have shown that the field of dual-use export controls is an important field ripe for more study. Findings from the field of export controls are of interest to both government practitioners and researchers alike. Work in this area provides us with ways to both test and refine theory, including that on the relationship between conflict and trade. My work is a step forward in better assessing coordination in security policy and practices among states in the post-Cold War era.

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Appendix A. APPENDIX FOR CHAPTER 3

A.1 UNITED STATES

Country Group D:1

Country	[D:1] National Security	[D:2] Nuclear	[D:3] Chemical & Biological	[D:4] Missile Technology
Afghanistan			X	
Armenia	X		X	
Azerbaijan	X		X	
Bahrain			X	X
Belarus	X		X	
Burma	X		X	
Cambodia	X			
China (PRC)	X		X	X
Cuba		X	X	
Egypt			X	X
Georgia	X		X	
Iran		X	X	X
Iraq	X	X	X	X
Israel		X	X	X
Jordan			X	X
Kazakhstan	X		X	
Korea, North	X	X	X	X
Kuwait			X	X
Kyrgyzstan	X		X	
Laos	X			
Lebanon			X	X
Libya	X	X	X	X
Macau	X		X	X
Moldova	X		X	
Mongolia	X		X	
Oman			X	X
Pakistan		X	X	X
Qatar			X	X
Russia	X		X	
Saudi Arabia			X	X
Syria			X	X
Taiwan			X	
Tajikstan	X		X	
Turkmenistan	X		X	
Ukraine	X			

Country	[D:1] National Security	[D:2] Nuclear	[D:3] Chemical & Biological	[D:4] Missile Technology
United Arab Emirates			X	X
Uzbekistan	X		X	
Vietnam	X		X	
Yemen			X	X

A.2 UNITED KINGDOM

EU Code of Conduct on Arms Exports - COUNCIL COMMON POSITION 2008/944/CFSP of 8 December 2008

defining common rules governing control of exports of military technology and equipment respect for Member States' international obligations and commitments, in particular the sanctions adopted by the UN Security Council or the European Union, and agreements on non-proliferation and other subjects;
respect for human rights in the country of final destination as well as respect by that country of international humanitarian law;
the internal situation in the country of final destination – Member States will not allow exports that would provoke or prolong armed conflicts or aggravate existing tensions or conflicts in the country of final destination;
preservation of regional peace, security and stability;
security of Member States and of territories whose external relations are the responsibility of a Member State, as well as that of friendly and allied countries;
behaviour of the buyer country with regard to the international community, as regards in particular its attitude to terrorism, the nature of its alliances and respect for international law;
existence of a risk that the military technology or equipment will be diverted within the buyer country or re-exported under undesirable conditions;
compatibility of the exports with the technical and economic capacity of the recipient country, taking into account the desirability that states should meet their legitimate security and defence needs with minimal diversion of human and economic resources for armaments.

From <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:335:0099:0103:EN:PDF> (accessed 6 June 2016)

Embargoed Destinations listed in the Export Control Order 2008 (Schedule 4 Parts 1 and 2)

The following guides contain details about the EU or Organization for Security and Co-operation in Europe (OSCE) embargoes and stricter trade controls in the named countries:

- Arms embargo on Armenia
- Arms embargo on Azerbaijan
- Arms embargo on Belarus
- Arms embargo on Burma
- Arms embargo on the Democratic Republic of Congo
- Arms embargo on Democratic People's Republic of Korea (North Korea)
- Arms embargo on Eritrea
- Sanctions on Iran
- Arms embargo on Ivory Coast
- Arms embargo on Lebanon
- Arms embargo on Libya
- Arms embargo on Republic of Guinea
- Sanctions on Syria
- Arms embargo on South Sudan
- Arms embargo on Sudan

Arms embargo on Zimbabwe

UN embargoed destinations and listed in the Export Control Order 2008 (Schedule 4 Part 3)

The following guides contain details about the UN embargoes and transit controls for military goods in the named countries:

- Arms embargo on Iraq
- Arms embargo on Liberia
- Arms embargo on Sierra Leone
- Arms embargo on Somalia

Partial EU embargoed destinations and listed in the Export Control Order 2008 (Schedule 4 Part 3)

China is subject to a partial EU embargo and also to transit controls for military goods: see the guide on the arms embargo on China.

Other countries listed in the Export Control Order 2008 (Schedule 4 Part 3)
These countries are subject to transit controls for military goods:

- Afghanistan
- Argentina
- Burundi
- Macao Special Administrative Region
- Rwanda
- Tanzania
- Uganda

Countries subject to transit control for Category B Goods (Schedule 4 Part 4)

The Export Control Order 2008 includes a wider list of countries which are subject to transit controls for Category B goods. Category B of the trade controls comprises small arms and light weapons, unmanned aerial vehicles (UAVs), long-range missiles and man portable air-defence systems.

Countries subject to military end-use controls

Some goods which are not on the UK Military List may need an export licence under the military end-use control.

The countries listed below are subject to military end-use controls:

- Armenia and Azerbaijan
- Belarus
- Burma
- Democratic Republic of Congo
- Democratic People's Republic of Korea
- Eritrea
- Iran
- Iraq

Ivory Coast
Lebanon
Liberia
Libya
Republic of Guinea
Sierra Leone
Somalia
South Sudan
Sudan
Syria
Zimbabwe
Further details in Export Control Order 2008.

SCHEDULE 4: COUNTRIES AND DESTINATIONS SUBJECT TO STRICTER EXPORT OR TRADE CONTROLS

PART 1: EMBARGOED AND NO EXCEPTION FOR TRANSIT

Democratic People's Republic of Korea
Iran

PART 2: EMBARGOED AND SUBJECT TO TRANSIT CONTROL FOR MILITARY GOODS

Armenia
Azerbaijan
Burma (Myanmar)
Democratic Republic of the Congo
Ivory Coast (Côte d'Ivoire)
Lebanon
Sudan
Uzbekistan
Zimbabwe

PART 3: SUBJECT TO TRANSIT CONTROL FOR MILITARY GOODS

Afghanistan
Argentina
Burundi
China (People's Republic other than the Special Administrative Regions)
Iraq
Liberia
Macao Special Administrative Region
Rwanda
Sierra Leone
Somalia
Tanzania
Uganda

PART 4: SUBJECT TO TRANSIT CONTROL FOR CATEGORY B GOODS

Albania
Belarus
Benin
Bosnia/Herzegovina
Burkina Faso
Cameroon
Cape Verde
Central African Republic
Chad
Colombia
Congo (Brazzaville)
Dubai
East Timor (Timor-Leste)
Eritrea
Ethiopia
Gambia
Georgia
Ghana
Guinea
Guinea Bissau
Haiti
Hong Kong Special Administrative Region
Jamaica
Kenya
Krygyzstan
Libya
Mali
Mauritania
Moldova
Montenegro
Morocco
Nepal
Niger
Nigeria
Oman
Pakistan
Russia
Senegal
Serbia
Sri Lanka
Syria
Taiwan
Tajikistan
Togo
Trinidad & Tobago

Turkmenistan
Ukraine
Venezuela
Yemen

A.3 JAPAN

White Countries (27) 輸出令別表第 3

(Countries that have strict export control systems participating in 4 International Export Control Regime and strictly implementing Catch-all Control of WMD)
Ireland, USA, Argentina, Italy, UK, Australia, Austria, Netherland, Canada, Greece, Switzerland, Sweden, Spain, Republic of Korea, Czech Republic, Denmark, Germany, New Zealand, Norway, Hungary, Finland, France, Belgium, Poland, Portugal, Luxemburg, and Bulgaria.

Countries of Concern

Iraq, Iran, and North Korea.

Countries under UN arms embargo 輸出令別表第 3 の 2

Afghanistan, Iraq, North Korea, Cote d'Ivoire, Democratic Republic of Congo, Libya, Sudan, Somalia, Liberia, Lebanon, Eritrea.

Foreign End-User List

A list issued by METI on foreign entities that may have some relationship to the development, production, manufacturing and/or storage of WMD and/or missiles. Approximately 500 groups in countries and regions including below are targets.

Afghanistan, Israel, Iran, India, North Korea, Syria, Taiwan, People's Republic of China, Pakistan, UAE, and Hong Kong.

A.4 DETAILED ECCN CODES AND HS CODES

Technology Group 1 - Encryption

- HS code 847150 - Digital Processing Units (likely to be controlled under US ECCN 5A992, 5A002, or 4A994)
- HS code 851762 - Machines for Reception, Conversion, Transmission (likely to be controlled under US ECCN 5A002 or 5A991)

Technology Group 2 - Navigation

- HS code 901420 - Instruments and appliances for aeronautical or space navigation (other than compasses) (likely to be controlled under US ECCN 7A994, 7A002)
- HS code 901490 - Parts for Direction-Finding Compasses (likely to be controlled under US ECCN 7A994, 9A991)

Technology Group 3 - Thermal Imaging

- US Sched B 9027502000 - Thermal analysis instruments and apparatus (likely to be controlled under US ECCN 6A993, 6A003)

Technology Group 4 - Chemicals

- HS code 283711 - Sodium Cyanides And Sodium Cyanide Oxides (likely to be controlled under ECN 1C350)
- HS code 292213 - Triethanolamine And Its Salts (likely to be controlled under ECN 1C350)

Technology Group 5 - Telescopic Sights

- HS code 901310 - Telescopic Sights for fitting to rifles (likely to be controlled under US ECCN 0A987)

Notes on Above Technology Groups

Technology Group 1 - Encryption

- HS code 847150 - likely to be controlled at 6-digit level
- HS code 851762 - only available from 2007 (HS 2007). HS 2002 code = 851780 BUT relatively unlikely to be controlled (~20%)

Technology Group 2 - Navigation

- HS code 901490 - about 30% likely to be controlled at 6-digit level – same as US 10 digits. Japan data only from 2005
- HS code 901420 - about 30% likely to be controlled at 6-digit level – US 10 digits 9014208040 and 9014206000 more likely to be controlled (42%+), but only available to 2010

Technology Group 3 - Thermal Imaging

- US Sched B 9027502000 - HS code 902750 unlikely to be controlled at 6-digit level (less than 5% versus over 30% at 10-digit level). This level of detail is available for US but not UK, Japan
UK Customs goes down to:
 - 90275000 - Instruments and apparatus for physical or chemical analysis, using UV, visible or IR optical radiations (excl. spectrometers, spectrophotometers, spectrographs, and gas or smoke analysis apparatus).

Technology Group 4 - Chemicals

- HS code 283711 - Likely to be controlled at 6-digit HS code level (95%+)

UK only has data from 2001, and only has data on to World/EU/Non-EU destinations (no data for China). No exports to any country in Asia recorded.

- HS code 292213 - Likely to be controlled at 6-digit HS code level (35-74%)

Technology Group 5 - Telescopic Sights

- HS code 901310 - UK does not have dual-use controls on gun sights, in the UK sights would be classified ML1d on the military list (ML1 = small arms)

- Other items reported under HS code 901310 include telescopes, periscopes, and optical devices used for industrial purposes.

Commerce Control List Categories (first two ECCN digits)

0 = Nuclear materials, facilities and equipment (and miscellaneous items)

1 = Materials, Chemicals, Microorganisms and Toxins

2 = Materials Processing

3 = Electronics

4 = Computers

5 = Telecommunications and Information Security

6 = Sensors and Lasers

7 = Navigation and Avionics

8 = Marine

9 = Propulsion Systems, Space Vehicles, and Related Equipment

Five Product Groups

A. Systems, Equipment and Components

B. Test, Inspection and Production Equipment

C. Material

D. Software

E. Technology

Appendix B. APPENDIX FOR CHAPTER 4

China-Related Security Events (based on official government [defense and foreign office] papers)

US

1998-2006: Possibility of a Taiwan Strait contingency (from March 2008 and President Ma in Taiwan, less concern over this)

PLA modernization, military budget (to present)

April 2001: EP-3 Hainan Island incident

(Sept. 11, 2001)

(2003-2009: Six-party talks)

2004-present: Concern over China arms sales (featured in 2010 DoD Annual Report to Congress)

2005-2006: US finds dual-use technologies to be contributing to Chinese military

Jan. 2007: Successful ASAT test

2006-2007: DoD notes “Of the major and emerging powers, China has the greatest potential to compete militarily with the United States and field disruptive military technologies that could over time offset traditional U.S. military advantages absent U.S. counter strategies.”

Sept. 2010: Senkaku Islands in East China Sea (Japan-China)

2011: China territorial disputes

April 2012: Scarborough Reef standoff (Philippines-China)

May 2013: Law enforcement ships to Second Thomas Shoal (near Spratly Islands)

Dec. 5, 2013: PLA Navy vessel and a U.S. Navy vessel operating in the South China Sea came into close proximity

Nov. 2013: Declaration of Air Defense Identification Zone (ADIZ)

2014: Reclamation at outposts in Spratly Islands, presence maintained at Scarborough Reef

Japan

2000: Spratly Islands mentioned in Defense Agency whitepaper

2000-present: China’s military force development/placement - modernization

Nov. 10, 2004: Chinese nuclear sub entered Japanese territory

2006-present: Increased number of Japan ASDF jet scrambles from China (esp. relative to Russia)

2007: Spratly Islands mentioned in Defense Agency whitepaper

2010: China surpasses Japan GDP

Sept. 2010: Chinese fishing trawler collides with Japan patrol ship

2010: China uses market-dominance in the rare earth industry as a political and diplomatic tool restricting exports of rare earth minerals to Japan after the collision

South China Sea activities mentioned in MoD whitepaper

Cyber activities mentioned in MoD whitepaper

2012: China now lumped together with N. Korea (rather than Russia/India) in MoD whitepaper

Increasing numbers of incursions into Senkaku Islands territory (through 2014)

April 2012: Governor of Tokyo announced plans to purchase 3 of the 5 Senkaku Islands from private Japanese owners

Sept. 2012: Government of Japan purchased the 3 islands

China protested the move and since that time has regularly sent maritime law enforcement ships – and, less often, aircraft – to patrol near the Senkaku Islands to assert PRC claims, including regular Chinese maritime operations within 12 nautical miles (nm) of the islands.

Nov. 2013: China announced an ADIZ in the East China Sea with coverage that included the Senkaku Islands and overlapped with previously established Japanese, South Korean and Taiwan zones

2014: Chinese navy found in Okinawa southern territory

UK

Dec. 1998: jailing of pro-democracy campaigners 1999

50th anniversary in 1999 of the People’s Republic of China, coupled with the 40th anniversary of the invasion of Tibet and the 10th anniversary of Tiananmen Square, led to a crackdown by the Chinese authorities on any perceived threat to stability. The repression of democracy activists persisted, and in July the spiritual/exercise group Falun Gong was banned, with many of its members facing re-education, jail sentences and reports of torture. There was continued harassment of Christian Church followers in engagement with the Dalai Lama on a long-term political solution in Tibet

(UK is the only country which does not recognize Chinese sovereignty over Tibet)

Dec. 2001: China’s entry into the World Trade Organisation (WTO)

2004: Domestic protests, mainly directed at local policies and officials, grew violent, posing increasing challenges to China’s internal security forces. Incidents in 2004 reached an all-time high of at least 58,000

2006: Chinese government has taken an increasingly hardline approach to freedom of expression

2006: according to the World Bank, China became the world’s fourth largest economy, surpassing Great Britain by 0.004 percent

March 2008: unrest in, which led to a widespread crackdown on freedom of religion and expression across Tibetan populated areas.

Summer 2008: human rights defenders detained or expelled from Beijing, and measures designed to provide greater freedom of expression for foreign journalists only partly implemented.

2009: increasing harassment of defence lawyers; the treatment of detainees in relation to ethnic unrest in Tibet 2008 and in Xinjiang in 2009

July 2009: Violent riots in Xinjiang (continuing)

Dec. 29, 2009: Execution of British national Akmal Shaikh

2010: House arrest of activists (Liu Xiaobo, others)

“state subversion” laws on Internet, China defends right to censorship

2011: following the events of the Arab Spring early in the year, the Chinese government responded harshly to online calls for a “Jasmine Revolution” in China. UK Government raised its concerns on freedom of expression regularly in 2011

April 3, 2011: Ai Wei Wei detained for 81 days

Nov. 2012: new Politburo and Politburo Standing Committee appointed; increased online censorship and harassment of human rights defenders

2014: Democracy protests in Hong Kong

2015: Space for civil society tightened, up to 300 individuals had been questioned

2015: UK the first major Western country to apply to join the new Asian Infrastructure Investment Bank

Technology Threat Variable Construction

Technology Group 1 - Encryption

- HS code 847150 - Digital Processing Units (likely to be controlled under US ECCN 5A992 [30%], 5A002 [20%], or 4A994 [10-25%])

5A992: AT 1

→ Unilateral US control

4A994: AT 1

→ Unilateral US control

5A002: AT 1, NS 1

→ Multilateral control

- HS code 851762 - Machines for Reception, Conversion, Transmission (likely to be controlled under ECN 5A002 [20%] / US ECCN 5A991 [25-30%])

5A002: AT 1, NS 1

→ Multilateral control

5A991: AT 1

→ Unilateral US control

-- Some military threat but indirect; more of human rights concern; not proliferation

Technology Group 2 - Navigation

- HS code 901490 - Parts for Direction-Finding Compasses (likely to be controlled under US ECCN 7A994, 9A991 [5%])

7A994: RS 1, AT 1

9A991: AT 1, UN

→ Unilateral US control

- HS code 901420 - Instruments and appliances for aeronautical or space navigation (other than compasses) (likely to be controlled under US ECCN 7A994 [12-30%], 7A002 [5-16%?])

7A994: RS 1, AT 1

→ Unilateral US control

7A002: NS 1, MT 1, AT 1

-- Military threat

Technology Group 3 - Thermal Imaging

- US Sched B 9027502000 (UK 90275000(?)) - Thermal analysis instruments and apparatus (likely to be controlled under US ECCN 6A993 [15-25%?], 6A003 [14-20%?])

→ Unilateral US control

-- Military threat; also strongly debated

6A003: NS 2, NP 1, RS 1/2, AT 1, UN

Technology Group 4 - Chemicals

- HS code 283711 - Sodium Cyanides And Sodium Cyanide Oxides (likely to be controlled under ECN 1C350)

1C350: CB 2

→ Multilateral control

- HS code 292213 - Triethanolamine And Its Salts (likely to be controlled under ECN 1C350)
- Multilateral control
- WMD proliferation risk / human rights concern, but not direct military threat
- 1C350 = 3: Chemical & Biological Weapons reasons

Technology Group 5 - Telescopic Sights

- HS code 901310 - Telescopic Sights for fitting to rifles (likely to be controlled under US ECCN 0A987) → US 0A987 could also include lasers
(https://www.pmdtc.state.gov/commodity_jurisdiction/determinationAll.html)

A987: FC 1, CC 1, UN

→ Unilateral US control

But ML list in UK

For EU, HS code 9013100000 is associated with/controlled by:

6A005 "Lasers", other than those specified in 0B001.g.5. or 0B001.h.6., components and optical equipment, as follows (DU 247) [in US this would be NS 2, NP 1, AT 1]

--- Direct military threat, not a proliferation concern

Figure B.1 Proliferation Threat and Controlled Exports to China

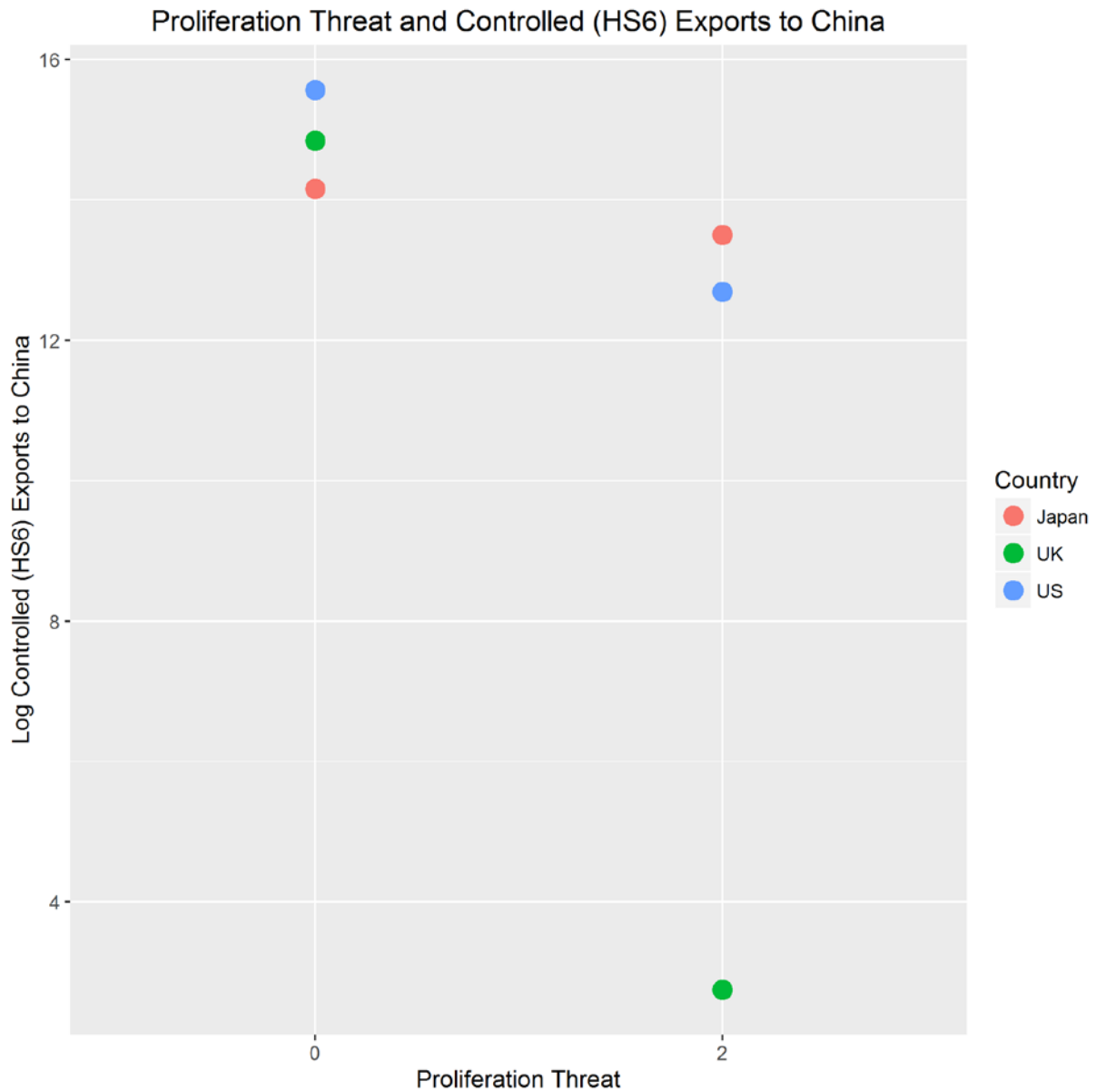


Figure B.1 shows the relationship between the proliferation threat a technology poses, which is coded from low to high (0 to 2) on the X-axis, and the natural log of controlled exports to China on the Y-axis. The countries are by dot color. This figure indicates that the United States and Japan are willing to export even technologies that pose a high proliferation threat (chemicals),

but not the UK. This data is skewed, however, due to the UK not publishing complete data on its chemical exports. We can see, however, that the United States and Japan are willing to export sensitive chemicals to China.

VITA

Crystal Pryor is receiving her PhD from the Department of Political Science at the University of Washington. Her dissertation, *Beyond Economics and Security: Strategic Export Control Policies in Advanced Countries*, is a comparative study of strategic export controls in the United States, Japan, and the United Kingdom. She evaluates the determinants of trade in high-tech, sensitive technologies to countries of concern, especially China. The Japan Foundation, the Japan Society for the Promotion of Science, and the UW European Center of Excellence have supported her dissertation fieldwork, and she is a recipient of the Peter May Graduate Research Grant. Crystal has also been a resident fellow at the East-West Center Washington (2012) and Pacific Forum CSIS (2015–2016). She will be a postdoctoral fellow in the US-Japan Program at the Weatherhead Center for International Affairs at Harvard University in 2016–2017.