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Rethinking Import and Export Controls for Defense-Related Goods

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The Center for Public Policy and Private Enterprise at the University of Maryland's School of Public Policy provides the strategic linkage between the public and private sector to develop and improve solutions to increasingly complex problems associated with the delivery of public services—a responsibility increasingly shared by both sectors. Operating at the nexus of public and private interests, the Center researches, develops, and promotes best practices; develops policy recommendations; and strives to influence senior decision-makers toward improved government and industry results.

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Executive Summary

There is little doubt that America's capacity to successfully wage war relies on promoting the health of the defense industry. At the same time, however, the U.S. must have selective controls on foreign access to critical defense technologies. Accordingly, import and export controls for defense-related goods and information have long been the focus of debate among American policymakers and business advocates.

Because the United States is a dominant and growing source of many countries' defense technology, the ideological battle over import and export controls has grown fiercer. At the center of this debate is the question of whether emphasis should be placed on national security concerns—controlling access to American military technology—or economic concerns—permitting American manufacturers and companies to more easily export these technologies for profit, while protecting them from foreign competition. Defense industry advocates, for their part, argue that current law stifles business, citing, for example, the intense and long licensing processes that are required to export seemingly insignificant items (e.g., nuts and bolts that are considered "dual-use" because at one point they were developed for use in military weapons systems; Avery, 2012). At the same time, some national security experts argue for greater sharing with our allies in order to ensure interoperability and maximum overall military capability, when fighting together in a coalition.

These issues are, at their core, a manifestation of a changing global environment—an adaptation from a bipolar world (i.e., the United States versus the Soviet Union) to a truly globalized world in which the affairs of all countries are interconnected. Indeed, the so-called modern arms control regime consists of the legislative remnants of a bygone era, strung together haphazardly and in desperate need of reform.

Substantive export control restrictions first emerged during World War I as a natural extension of the "total war" that ensued. The Trading with the Enemy Act of 1917 gave the President the power to oversee or restrict any and all trade between the U.S. and its enemies in times of war. The trend towards increased export restrictions continued as the Neutrality Act of 1935—

possibly the strictest export restriction regime ever devised—was enacted in the years leading up to World War II, cutting off any sale of military weaponry to belligerents.

The end of the Second World War ushered in a new regime. Previously, restrictions were imposed on the basis of country (Trading with the Enemy Act) or product (Neutrality Act). However, in the post-war environment, a more mixed approach was deemed necessary. The Export Control Act of 1949 was the beginning of this new era of export controls, focused primarily on restricting trade with Soviet-bloc countries.

Today's most important export regulatory authorities, the International Traffic in Arms Regulations (ITAR) and the Export Administration Regulations (EAR), both derive from the 1970s. The legislation leading to the creation of these regulation regimes is described below.

- *Arms Export Control Act (AECA) of 1976*—grants the President the power to control the export of defense products and services. The act mandated the creation of the ITAR. The principal objective of the act was to ensure that exports of defense systems and services are used solely for legitimate defensive purposes. A secondary objective is to restrict the export of certain sensitive materials, such that they are only available to trusted countries, after a strict licensing process and thorough documentation, as well as other requirements, such as not transferring the technologies to any other country.

- *International Emergency Economic Powers Act (IEEPA) of 1977*—authorizes the President to take actions to regulate commerce in the case of a declared national emergency. Potential actions include blocking transactions or freezing assets and, if attacked, actually seizing the assets of the aggressor. In effect, the IEEPA gives the President the authority to cut off trade with certain states, non-state actors, and groups of individuals.

- *Export Administration Act (EAA) of 1979*—is reauthorized annually by the President under IEEPA. The act was a derivation of the 1969 act by the same name and focuses primarily on dual-use items (i.e., items that have both commercial and military purposes, or result in a proliferation of weapons of mass destruction). Unlike the earlier version, the

1979 act included the provision that if an item was so prevalent abroad, and of a quality comparable to what would be exported from the United States, such that trying to control it would be a futile exercise, it should not be controlled. The Secretary of Commerce is tasked with making this decision. This was a concession to business interests that felt the law, at times, unfairly restricted trade, even though its restriction would have no noticeable effect on the goal of restricting access to these items.

Unlike IEEPA, both AECA and EAA rely on regulatory mechanisms for enforcement, namely the ITAR, administered by the Department of State, and the EAR, administered by the Bureau of Industry and Science within the Department of Commerce. These organizations develop the lists of controlled exports in each category, determine which applicants receive licenses, and punish those who violate the law. The ITAR and EAR are described below.

- *International Trade in Arms Regulations (ITAR)*—the set of regulations built around the AECA dealing primarily with national security and expressly, defense-related items and services. The products regulated include weapons systems (e.g., aircraft, tanks, etc.) but also include subsystems or components critical to military systems. The determining factors are listed as follows:
  a. Is it specifically designed, developed, configured, adapted, or modified for a military application, and
     - does not have predominant civil applications, and
     - does not have performance equivalent (defined by form, fit, and function) to those of an article or service used for civil applications; or
  b. Is it specifically designed, developed, configured, adapted, or modified for a military application, and has significant military or intelligence applicability such that control under this subchapter is necessary? (ITAR, part 120)

  In order to remain in compliance when exporting products that potentially fall under ITAR regulations, the exporter is required to navigate a demanding licensing process that can take a significant amount of time and resources. These licenses are issued for the

item, not for the order; thus, "on a single purchase order some products may require a license while others do not" (Cheadle, 2005, p. 80).

Moreover, ITAR Part 121, known as the U.S. Munitions List (USML), is not a list of products so much as a list of categories, descriptions, and rules to determine whether or not a product should be controlled. For example, one such category is major weapons systems. Note, however, that the category includes "all components used in the items covered by this category if they were specifically developed or modified for military applications" (ITAR, Part 121). Often, the State Department has to conduct a lengthy review in order to determine whether the component in question was initially created for a specific military use. The State Department also attempts to determine whether the end product is for "military use," that is, will "be used in a military way for offensive or defensive purposes" (Cheadle, 2005, p. 82).

- *Export Administration Regulations (EAR)*—regulations governed by the Department of Commerce's Bureau of Industry and Security (BIS) under the Commerce Control List (CCL).The EAR, unlike ITAR, is focused on dual-use products, classified under the Commerce Control List (CCL), as well as anti-boycott provisions of the EAA. The BIS uses a simpler set of rules than does the State Department to determine licensing requirements for commercial items.

  In order to grant a license, the Commerce Department carries out an inter-departmental process wherein the Department carries out the evaluation, but with the input and support of other agencies, in particular, the Departments of State, Defense, and Energy. If no outside agency input is needed, the Department of Commerce can either inform the applicant that a license is not required, or approve or deny the request. Should the Commerce Department determine that another agency's review is necessary, there is a timeline for the agency to return its recommendation. Within 10 days, the agency may request further information or details; within 30 days, the agency needs to either recommend approval or denial of the license. If it chooses to give no feedback, the agency is seen as having no objection to whatever decision the BIS/Commerce Department chooses (Fergusson, 2005).

The United States does not use restrictions on imports in the same way as on exports—rather than rely on lists, the restrictions are based on the expressed preference for American goods over imported goods, particularly in a few classes. Also, unlike export restriction laws, which have evolved significantly over time to the point where their original content is practically undetectable, import procurement laws have undergone less tumultuous changes; in fact, the original laws are still largely in effect. These laws are also not as extensive as export control laws, but pertain to a far greater number of items. Below, we describe the two primary import restriction laws, the Buy American Act and the Berry Amendment.

The Buy American Act, passed in 1933, was rooted in the belief that by increasing the government purchase of domestic goods, the United States could lift itself out of the Great Depression. As its name implies, the act gave preferential treatment to the use of American-made products. Today, the act contains three original sections and two additional ones.

Reviews of the Buy American Act are mixed. Although some see it as a necessary step toward protecting American business, others do not think it has worked as intended. For example, Hirschman (1998) says, "The Buy American Act appears to have been poorly planned, hastily passed, and inconsistently enforced" (p. 23). Hirschman largely blames poor definitions, lack of standard rules, and general vagueness. Indeed, many companies find it difficult to interpret the regulations. To cite one case, in 2011, Home Depot was sued by its competitors for allegedly selling Chinese goods (such as power tools) to the United States government, in contradiction of the Buy American Act. Home Depot, for its part, rejected the claims, saying if they did sell foreign goods it was unintentional, but this still prompted an investigation (Little, 2011).

Another statute related to the government procurement of foreign goods is the Berry Amendment. While the Buy American Act gives preference to domestic products over foreign products with certain exceptions, the Berry Amendment overrides these exceptions for particular items, namely food, clothing, and specialty metals. However, whereas the Buy American Act applies to all government contracting, the Berry Amendment applies only to defense contracting. In addition, whereas the act covers only procurement within the United States, the Berry Amendment is enforced worldwide. Finally, unlike the Buy American Act, which defines the

term “substantially all” as no more than 50% of a product, the Amendment requires that 100% of the product be American made (Grasso, 2005).

In force since 1941, the Berry Amendment was actually an amendment to the Fifth Supplemental Defense Department Appropriations Act and has been altered multiple times since. This regulation maintains that the DoD “give preference in procurement to domestically produced, manufactured, or homegrown products, notably food, clothing, fabrics, and specialty metals” (Grasso, 2005, p. i). However, exceptions were later added when food, specialty metals, and measuring tools were used for contingency operations and in instances of compelling urgency (Grasso, 2005).

The Berry Amendment requires that certain items be from domestic sources; however, this requirement extends to all of the item’s components as well. Accordingly, clothing, explicitly listed as a controlled item, must be produced in the United States, as must all of the cotton or other cloth materials, natural or synthetic, that are part of the product. This regulation goes beyond clothing; for example, if the DoD is trying to obtain cotton swabs, then the cotton must be of American origin. The requirement applies to the items being grown, reprocessed, reused, and produced. By contrast, the Buy American Act only applies to the end item purchased by the government, so weapon systems may, and do, contain foreign parts—usually selected for their superior performance.

Despite these export and import restrictions, our allies are still able to purchase the weapons systems that they need from the United States. In fact, the United States is the largest producer and exporter of defense goods in the world, supplying dozens of countries with a range of defense and military products. On the import side, the United States is capable of designing and manufacturing the vast majority of military systems upon which it relies. However, import restrictions impede the United States’ ability to acquire defense-related goods as efficiently and cost-effectively as possible. The problem here is two-fold. The DoD is barred from acquiring foreign suppliers’ products—products that are not only cheaper, but in some instances, technically superior. Secondly, the waiver process complicates matters further, creating needless delays for products that may not even be available domestically. Clearly, the current regime is

far from perfect. Below, we discuss some of the more pressing challenges associated with current export and import regulations.

1. Restrictions on dual-use technologies

Much to the chagrin of American business, the ability of American companies to export certain goods, including non-defense goods, has been curtailed significantly. Restrictions on dual-use items are particularly troubling. Many such items were initially developed by the military but now are in widespread use, including powerful microchips and computers, but also mundane items, like the metal bolts used to build satellites (Avery, 2012). Many items under ITAR controls are not top-secret technology; rather, they are very similar to commercial, non-controlled items. In fact, they increasingly begin as commercial items and then are adopted by the military—because of their superior performance and/or lower cost.

2. Long delays for approval

Business deals with foreign firms involving any type of controlled good or information must be approved in advance. Often, the approval process can take several months. In fact, without the appropriate license, even approaching the foreign firm may be illegal. In some instances, making a telephone call to a foreign company requires pre-approval. Needless to say, many international business opportunities are hindered as a result (Oliver, 2001), which, in turn, diminishes the United States' technological edge by reducing demand for high-tech products.

3. Fewer opportunities for joint research

The current regime greatly hinders the opportunity to engage in joint research. American institutions are limited, as are foreign students. Combined, these issues are making it harder for the U.S. to have significant technological advancements, thus eroding our previously large technological advantage over our adversaries (Chakrabarti, 2009). Since information is controlled by both ITAR and EAR, new knowledge emerging from American industry can require a license for export. In fact, simply passing the information to a foreign national living in the United States is considered a "deemed export." Under the current regulations, companies and universities may be required to obtain an export license before releasing controlled dual-use technology, or source code subject to the EAR, to a foreign national who is not a permanent resident of the United States (or a member of certain groups of protected individuals, such as

asylum holders). Consequently, the transfer of technology within the U.S. to a foreign national may be considered an export to his home country. As one might imagine, such a status engenders many complications for foreign students who want to study advanced technology and science. Indeed, even being in a classroom, when a controlled technical procedure is discussed, may be considered a violation. As a result, very promising students are deterred from pursuing a technology-focused education in the United States; to the detriment of the American commercial and defense industries.

4. Technology outpaces the regulations

Revisions of the regulations and the control lists are rare, whereas technology advancements are constant and regular. This delay means that the regulations fall even further behind, as technology advances, making the system even more inadequate as time passes. Thus, much of the new technology is not properly protected, and old technology that has become ubiquitous is controlled unnecessarily.

5. Regulations damage relationships with allies

The current regime may be hurting U.S. relationships with allies. Oliver (2001) notes that "Potential allies do not view restricting technology that would enable their citizens to have a higher standard of living, or more security, as the act of an America who wants to have friends" (Oliver, 2001, p. 5). Our allies may resent when we require that they obtain licenses—let alone when we reject them—because these actions hinder their ability to develop, from both an economic and security perspective (Oliver, 2001).

6. Lack of competition results in higher prices

Import regulations have been successful in their stated purpose of limiting the use of foreign products in government contracting. The primary goal of the import control system—protection of American manufacturers and producers of certain goods from foreign competition—has, in a sense, been successful in that it has supported American businesses that would otherwise lose contracts to imported goods that are often cheaper or better. But the policies have had unintended consequences. For instance, the cost of hiring contractors is significantly higher than might otherwise be the case, because of the lack of competition from abroad. In addition, foreign

technologies are not always inferior to those built in America, so they may offer both lower cost and higher performance.

7. Interruptions in the supply chain

A 2004 study by the Office of the Deputy Under Secretary of Defense for Industrial Policy examined 12 major DoD programs and found that 4.3% of the value of the contracts came from foreign subcontractors. Additionally, in contradiction to the aforementioned concerns, the report states that this has "not negatively impacted long-term readiness or national security;" instead, they cite it as a benefit, as it allows the DoD to access foreign technologies, encourages interoperable systems with allies, improves foreign access for U.S. firms, and ensures competition that helps American industry innovate (Office of the Under Secretary of Defense for Industrial Policy, 2004, p. v).

8. Increasing cybersecurity threats

Virtually all weapon system components, as well as business systems, use software extensively. Moreover, software development is now also a global industry, and some of the software used by the DoD and the defense industry has been, at least in part, developed abroad. This can include countries that may be motivated to exploit and/or manipulate software. This can potentially result in the theft of information and intellectual property, the destruction of information systems, or even the destruction of physical systems.

Recommendations

There is a clear need for both import and export controls; however, the current system definitely has significant flaws that impact its ability to succeed. Correcting these issues requires a strong plan of action to revamp and re-imagine the control system. Import and export controls are clearly necessary in order to ensure the protection of American military technology as well as the health of the defense industry. However, the current regime must be revised to take advantage of the globalized economy, while addressing the challenges cited in the previous section. Below, we provide our recommendations.

- The lists of regulated items should be combined and simplified.

  Exporters are not always sure whether their product is on the USML or the CCL, or regulated through some other mechanism, creating confusion and errors. A master list would greatly aid the process. Creating a single list would require significant commitment on the part of the U.S. government. All redundancies would have to be eliminated. First, however, policymakers would have to determine which items actually require protection. The removal of thousands of items will act to free up some of the backlog in the system, thereby facilitating the creation of a new list. However, this list must be frequently updated to take care of rapidly-changing situations (e.g., regarding technology, available foreign goods, etc.).

- Defense-related items should be assigned to categories based on their level of sensitivity.

  Presently, all items are treated equally. This results in tank brake pads that are identical to those used on fire trucks being controlled just as stringently as the tank's complex targeting systems or the entire tank itself. This distracts from protecting goods that could actually impact national security.

- Export decisions should be based, in part, on the status of a country's relationship with the United States.

  Because the overwhelming majority of licenses requested are from U.S. allies, and for items that are not particularly risky, this would free up significant resources necessary to expedite the approval of other licenses, which will make exporting more efficient overall. And, because almost all of the license requests of this type are already being approved, this policy would not create significant security vulnerabilities.

  Corresponding to the designations assigned to "defense-related goods," countries should be assigned to categories based on the status of their relationship (e.g., most trusted, trusted, less trusted, least trusted) with the United States. To borrow from the security clearance scheme, once again, an individual with a secret clearance can only gain access to documents marked secret or below. (Perhaps for geopolitical sensitivity reasons, this could be coded as category A, B, C, or D—and used as an incentive for countries to control their third country exports, for example.) Similarly, a country with a mid-level

clearance could import items of certain designations without a license. Under this type of system, countries would be able to understand what will be required to import certain goods from the U.S. prior to beginning what is today a long and complex process. Under this system, American regulators and lawmakers could allow license-free exports of certain goods to certain countries without allowing open exporting; and yet, more carefully controlling which countries can obtain which defense products.

- The United States should not unilaterally impose controls on commercial variants of defense-related goods for which it is not the sole supplier.

  If the United States believes that certain defense-related products should be barred from export, it must seek multilateral participation; otherwise, an embargo that is imposed unilaterally will be ineffective, not to mention costly to American companies. For example, U.S. restrictions on the export of commercial infrared devices led to decreased revenues for American firms, while boosting the profits of European firms (for which the export of infrared devices was less restrictive). Needless to say, the world is no safer simply because the U.S. stopped selling commercial infrared devices to foreign buyers, and U.S. producers simply lost their world market.

- Protectionist import restrictions should be eliminated.

  The United States should rely on free-market exchange, not protectionist import policies, to promote and improve America's competitiveness both at home and abroad. Though protectionist policies may benefit certain industry segments, the market distortions that are created lead to higher prices and reduced domestic consumption. Moreover, the industry segments that are protected have less incentive to innovate and reduce their costs. As a consequence, the industries themselves may suffer from their lack of global competitiveness, leading to decreased revenues from foreign sales. The longer protectionist policies are in place, the less competitive the industries will become. Reducing import restrictions would lead to the increased domestic development of weapons systems and their associated products, both in terms of quantity and quality, while spurring economic growth.

Our import–export control systems, originally established to protect American security interests, have begun to undermine the economic, technologic, and military capabilities of the United States. Since the last major revisions of America's import and export systems, the world has changed markedly. Whereas before the United States was the unrivaled leader in most technological fields, today it is one of several leaders in many technological fields and is lagging in some.

The United States can no longer afford to pursue an import–export regime that reduces American access to new technologies while protecting uncompetitive domestic firms and restricting leading U.S. companies from pursuing foreign sales abroad. To be sure, certain technologies must be protected. But the best way to ensure that this occurs is by reducing the scale and scope of the current restrictions so that attention can be focused on specific technologies, the protection of which is vital to U.S. security interests. The failure to reorient our priorities in the new global environment will only lead to a technological decline and obsolescence in certain industry segments. Technological decline, and the economic decline that it portends, are the true threats to America's security.

The Administration has recently taken steps to update how the U.S. government protects sensitive technologies and regulates exports of munitions and commercial items with military applications. These rules will affect items regulated for export under two categories on the USML (Aircraft and Associated Equipment and Gas Turbine Engines). Both of these categories are extremely important to the aerospace industry and represent more than $20 billion in annual exports. There are plans to continue the reviews and reform the remaining 17 USML categories. This is certainly a step in the right direction (Department of State, 2013).

Rethinking Import and Export Controls

For Defense-Related Goods

I. Introduction

There is little doubt that America's capacity to successfully wage war relies on promoting the health of the defense industry. At the same time, however, the U.S. must control foreign access to new defense technologies. Accordingly, import and export controls for defense-related goods and information have long been the focus of debate among American policymakers and business advocates. Indeed, weapon systems constitute a major American industry that is also of great importance to geopolitical goals. Small arms, light weapons, and ammunition—a large, though relatively cheap segment of weaponry—account for about $996 million in U.S. imports and $607 million in exports according to UN data (Google Ideas INFO, 2012). Examining the broader data on defense-related exports, it becomes clear just how large the U.S. weapons industry is. Defense exports of equipment, such as military aircraft, firearms, and explosives, were valued at $22 billion in 2009 (Government Accountability Office, 2010).

Because the United States is a dominant and growing source of many countries' defense technology, the ideological battle over import and export controls has grown fiercer. At the center of this debate is the question of whether emphasis should be placed on national security concerns—controlling access to American military technology—or economic concerns—permitting American manufacturers and companies to more easily export these technologies for profit, while protecting them from foreign competition. Defense industry advocates, for their part, argue that current law stifles business, citing, for example, the intense and long licensing processes that are required to export seemingly insignificant items (e.g., nuts and bolts that are considered "dual-use" because at one point they were developed for use in military weapon systems; Avery, 2012). At the same time, some national security experts argue for greater sharing with our allies in order to ensure interoperability and maximum overall military capability when fighting together in a coalition. But there is also some crossover between the two sides; indeed, many proponents of loosening export restrictions claim that doing so actually enhances national security. A number of other issues are at stake—such as relationships with our

allies and the ability of our allies to obtain American military technology—that all play a role in the debate.

These issues are, at their core, a manifestation of a changing global environment—an adaptation from a bipolar world (i.e., the United States versus the Soviet Union) to a truly globalized world in which the affairs of all countries are interconnected. Indeed, the so-called modern arms control regime consists of the legislative remnants of a bygone era, strung together haphazardly and in desperate need of reform. Today, information and technology spread much more quickly, making it more difficult to control the re-export and unintended transfer of goods to third parties. Globalization also means that the United States continues to import and export in higher volumes. As a result, the need for reform grows in significance with each passing day.

Report Roadmap

We begin by providing a background on import and export controls, including a historical examination of early export restrictions as well as current export and import controls. Then, we examine the impact of current policies, including their benefits and drawbacks. Next, we describe a policy that, we believe, achieves a balance that enhances both national security and economic growth. Finally, we discuss potential obstacles to implementing the policy. Throughout the report, we provide examples, often set apart from the main text, in order to illustrate important points.

II. Background

Substantive export control restrictions first emerged during World War I as a natural extension of the "total war" that ensued. The Trading with the Enemy Act of 1917 gave the President the power to oversee or restrict any and all trade between the U.S. and its enemies in times of war. The purpose of this act was threefold: "(1) to prevent aid and comfort to enemies; (2) to make available for the financing and successful prosecution of the war such funds and property in this country as belongs to the enemies or the allies of enemies; and (3) to protect interests in property rights of private persons." (Lourie, 1943, p. 206). To this day, determining who is an "enemy" is the responsibility of the executive branch—the President can deem any foreign country an enemy, making it illegal for any American (individual or business) to conduct trade with it. The only country currently held under this status is Cuba, following the 2008 change of status of North Korea. In order to ensure adherence to this law, its provisions carry strong penalties, including stiff fines and significant prison terms.

The trend toward increased export restrictions continued as the Neutrality Act of 1935, possibly the strictest export restriction regime ever devised. It was enacted in the years leading up to World War II, cutting off any sale of military weaponry to belligerents. Unlike other export controls that distinguish allies and enemies, the Neutrality Act prevented the United States from exporting arms to any belligerent in ongoing conflicts throughout the world. Devised to inhibit Italy's invasion of Ethiopia, this law was ultimately applied to other countries as war broke out in Europe and throughout the world. To the chagrin of President Roosevelt, the law made it difficult for the United States to provide aid to American allies, at least prior to America's direct involvement in the war (Weiss, 1968).

Post–World War II Export Restrictions

The end of the Second World War ushered in a new regime. Previously, restrictions were imposed on the basis of country (Trading with the Enemy Act) or product (Neutrality Act). However, in the post-war environment, a more mixed approach was deemed necessary. The Export Control Act of 1949 was the beginning of this new era of export controls; focused primarily on restricting trade with Soviet-bloc countries.

The act had three primary control criteria. First, scarce goods were barred from export if their export could have a negative impact on the American economy. Second, Presidents could impose restrictions on items that could be used to build weapons of mass destruction, violate human rights, or improve the state of foreign missile technology. Third, restrictions were implemented to help ensure national security, barring export of items or information that could "make a significant contribution to the military capability of any country that posed a threat to the national security of the United States" (Fergusson, 2005, p. 2). Together, these restrictions led to what became a very restrictive system. Fergusson (2005), of the Congressional Research Service, described the regime as a "near-embargo" (p. 2)

When the Export Administration Act (EAA) was passed in 1969, there were major changes in how the export restriction regime functioned due, in part, to pressure from the business community, which saw removing some of these restrictions as a potential opportunity to jumpstart a slumping economy. However, the most noticeable change was the replacement of the word "control" with "administration." Although this change carried no practical difference, it "reflected an easing of tensions between East and West" (Dorsett, 1993, p. 21). More substantively, the act attempted to coordinate the U.S. control list, so that it would be closely aligned with the West's joint export control venture, known as the Coordinating Committee for Multilateral Export Controls (CoCom) list. However, the United States' list remained largely intact.

It is worth noting that prior to the EAA, Congress passed the Atomic Energy Act of 1954, which imposed restrictions specifically aimed at preventing the spread of nuclear weapons material and technology. The act restricted the sale of nuclear technology for the development of nuclear weapons. However, working with other countries to develop peaceful nuclear programs was allowed (Borich, 2001).

Current Export Policies

The current restrictions on exports are mostly derived from a series of laws passed during the 1970s, during the height of the Cold War. However, the national security environment has changed dramatically in the intervening 40-plus years. The end of the Cold War marked the

starting point of an American security transition. With no clear peer rival, the United States expedited efforts to downsize its military forces in the 1990s to take advantage of the "peace dividend." Some even wrote of the end of history, inferring that mankind had reached the pinnacle of ideological evolution since the largest threat to the democratic principles of the United States had collapsed and left the U.S. as the world's lone superpower (Fukuyama, 1989).

In the aftermath of the Cold War, the global defense industry underwent significant consolidation to adjust to the new global arms market (Gansler, 2011). Today, following this widespread consolidation, only six of 50 major U.S.-based contractors from 1990 remain in business (when BAE, a U.K.-headquartered firm, is included); of those, only two (Boeing and Lockheed Martin) produce fixed-wing aircraft. In similar fashion, Europe's defense firms consolidated, and today only a few remain—including BAE Systems; European Aeronautic, Defense, and Space Company (EADS); Thales, Finmeccanica, Saab, and Dessault.

This consolidation rationalized the overall capacity and increased the efficiency of the surviving firms by combining their operations, thus allowing for significant cost savings. As a result of the increasingly reduced domestic competition within the consolidated industrial base, DoD officials recognized the need to expand the U.S. defense industrial base from solely domestic suppliers to a global one.

The United States continues to dominate this market with large research and development (R&D) investments ($80 billion versus approximately $12 billion for all of the European Union countries combined). Globalization enables a more efficient integration of the sources of supply but, at the same time, elevates the significance of sales to foreign markets. Furthermore, with the anticipated reduced defense expenditures, maintaining an autarkic defense industry is simply unaffordable. European defense companies were forced to face this in the mid-1990s and responded with several cross-border mergers. They formed several trans-European firms, such as EADS, because their domestic markets were too small. These firms can now effectively compete against U.S. firms, as was demonstrated in 2012 with the competition for the U.S. Air Force tankers between Boeing and EADS.

In this new global environment, regulations aimed at restricting imports and exports hinder the ability of the DoD to experience the advantages enabled by globalization in the 21st century.

Once the Soviet Union dissolved, the motivation behind decades of military modernization and Cold War national security policy no longer existed. However, the illusion of a long-lived peace was short-lived, and in the early 1990s, the U.S. was engaged in a very different conflict, the first Gulf War. Then, on September 11, 2001, the country's threat landscape again changed dramatically. The events of that day created a new urgency for America's defense establishment and laid the foundation for the adjustment of the DoD to the new global security environment. This adjustment proved especially vital, as the threats now addressed by the DoD were vastly different than the ones it faced during the previous five decades. The United States now faced increasing threats emanating from terrorists often based in weak and failing states, a diffusion of power and military capabilities to non-state actors, increasing unpredictability about the locations of conflict, and increasing potential for miscalculation and surprise. Thus, many of the existing policies restricting exports, developed in response to the Soviet Union, are outdated and unnecessarily restrictive, even if, at their inception, they were well-intentioned and appropriate.

Today's most important export regulatory authorities, the International Traffic in Arms Regulations (ITAR) and the Export Administration Regulations (EAR), both derive from the Cold War era. Together, they have provided the basis for an evolving framework. The legislation leading to the creation of these regulatory regimes is described below.

- *Arms Export Control Act (AECA) of 1976*—grants the President the power to control the export of defense products and services. The act mandated the creation of the ITAR (detailed in the next section). The principal objective of the act was to ensure that exports of defense systems and services are used solely for legitimate defensive purposes. Therefore, decisions under AECA are meant to "take into account whether the export of an article would contribute to an arms race; aid in the development of weapons of mass destruction; support international terrorism; increase the possibility of outbreak or escalation of conflict; or prejudice the development of bilateral or multilateral arms control or nonproliferation agreements or other arrangements" (United States Congress, 1976). A secondary objective is to restrict the export of certain sensitive materials, such that they are only available to trusted countries after a strict licensing process and thorough documentation, as well as other requirements such as not transferring the technologies to any other country.

Although ITAR is the oft-cited method for enforcement of AECA provisions, another method exists within the law; namely, if the president becomes aware of a potential "substantial violation" of AECA, he is required to report it to Congress. Then, Congress can, by resolution, determine that a violation has occurred. If this were to occur, the offending country could no longer purchase from the United States; in addition, all existing agreements, payments, shipments, and so forth, would be terminated. However, this provision has never been exercised (Grimmett, 2005).

Punishments for violations can be very stiff. If criminal intent is determined, both an institution and an individual can face fines up to $1,000,000 per violation; individuals can even receive more severe penalties, up to ten years in prison, either in place of, or in addition to, a fine. If a violation is considered to be a civil violation rather than a criminal one, the fine per violation is reduced to a maximum of $500,000 for both institutions and individuals, with no risk of jail time (Vice Provost and Dean of Research, Stanford University, n.d.). There are other potential penalties; for example, both people and institutions can have goods seized, and both can be debarred from future exporting. Currently, there are 467 individuals and institutions disbarred for AECA/ITAR violations (Department of State, Directorate of Defense Trade Controls, 2012).

- *International Emergency Economic Powers Act (IEEPA) of 1977*—authorizes the President to take actions to regulate commerce in the case of a declared national emergency. Potential actions include blocking transactions or freezing assets, and, if attacked, actually seizing the assets of the aggressor. In effect, the IEEPA gives the President the authority to cut off trade with certain states, non-state actors, and groups of individuals.

  Presidents have exercised their authority under the IEEPA on numerous occasions. For example, Iran has been deemed a threat since 1979, due to its continued support for terrorism, as has Zimbabwe, since 2003, for suppressing democracy. With regard to non-state actors, a wide range of qualifications have been used, including those engaged in the spread of weapons of mass destruction, terrorists trying to undermine the Middle East peace process, and people contributing to the violence in the Democratic Republic of the

Congo. Interestingly, when the EAA of 1979 nearly expired in 1984, President Reagan reauthorized it by declaring an emergency under IEEPA. When it actually did expire in 1994, President Clinton (and all subsequent Presidents) authorized it in the same way.

Punishments for violations of IEEPA are also very strict. Criminal penalties can amount to $1,000,000 fines for both institutions and individuals and may include up to twenty years in prison. Civil penalties include a fine $250,000 or twice the value of the transaction, whichever is greater. Other punishments, including the denial of future exports and seizure of goods, are also possible (Vice Provost and Dean of Research, Stanford University, n.d.).

- *Export Administration Act (EAA) of 1979*—is reauthorized annually by the President under IEEPA. The act was a derivation of the 1969 act by the same name and focuses primarily on dual-use items (i.e., items that have both commercial and military applicability). Unlike the earlier version, the 1979 act included the provision that if an item was so prevalent abroad, and of a quality comparable to what would be exported from the United States such that trying to control it would be a futile exercise, then it should not be controlled. This decision is made by the Secretary of Commerce. This change was a concession to business interests that felt the law, at times, unfairly restricted trade, even though its control would have no noticeable effect on the goal of restricting access to these items.

  Violations of the EAA regulations also carry stiff penalties. Since the EAA was extended (using the IEEPA emergency powers), the penalties are the same as those described above. Should Congress reauthorize the EAA, the penalties authorized therein would take effect once again. EAA violations fall into three categories, "willful violations,"[1]

[1] Willful violations are commonly defined as a voluntary act in complete disregard or indifference to the regulations.

"knowing violations,"[2] and civil violations. For willful violations, penalties on institutions include a fine of $1,000,000, or five times the value of the exports, whichever is greater; and for individuals the penalty is $250,000 and/or ten years imprisonment per violation. Knowing violations carry a penalty of either $50,000 or five times the value of the exports for institutions; for individuals, the fine is the same and the prison term is five years. Civil penalties under EAR include a $12,000 fine per violation, unless the item is controlled for national security, in which case the violation carries a $120,000 fine. As with the other laws, denial of export[3] and seizure of goods are also possible punishments, at the discretion of the agency (Vice Provost and Dean of Research, Stanford University, n.d.).

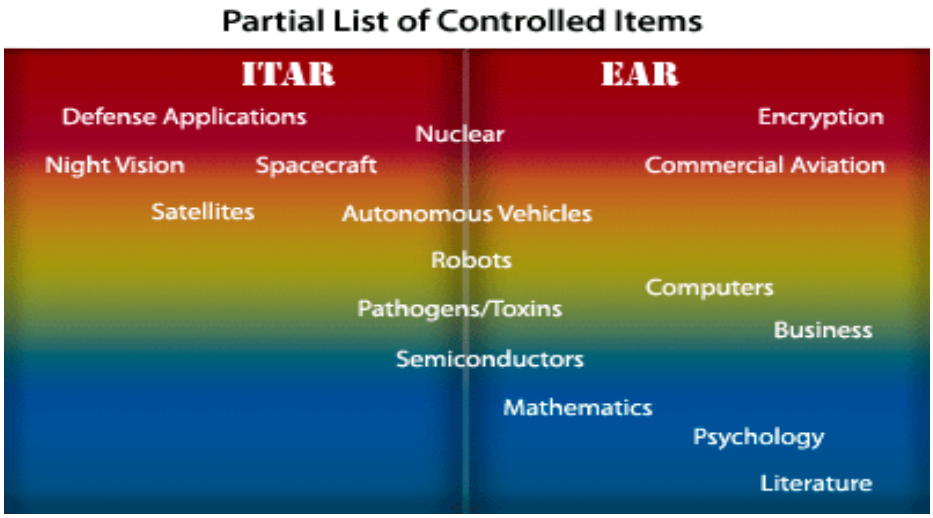

Figure 1. ITAR vs. EAR controls (MIT OSP)

[2] Knowing violations are appropriate when the individual or institution knew the regulations (or should have known the regulations because they were effectively communicated), the trade was in violation of the regulations, and they knew that the trade was occurring in that fashion. The main difference with a willful violation is the intent—a willful violation occurs when the rules are blatantly ignored, whereas a knowing violation could be accidental.

[3] Presently, there are 445 people on BIS's Denied Persons List—the list of people with whom one cannot trade. However, there are several duplicates, as well as incarcerated persons who would not be able to trade anyway (Bureau of Industry and Security, 2012).

Together, these laws provide a framework that governs the U.S. export control system. However, it is the regulatory structures created to enforce these laws—the International Trade in Arms Regulations and the Export Administration Regulations—that determine which items should be protected (See Figure 1).

Export Regulatory Authorities

AECA and EAA rely on regulatory mechanisms for enforcement (unlike IEEPA), namely the ITAR, administered by the Department of State, and the EAR, administered by the Bureau of Industry and Science within the Department of Commerce (DoC). These organizations develop the lists of controlled exports in each category, determine which applicants receive licenses, and punish those who violate the law. These institutions follow different processes and have different controlled items. Accordingly, exporters must be thoroughly familiar with the regulations in order to determine which regulatory regime a product falls under; in other words, the exporters themselves are required to determine which agency to approach to successfully and legally export their products. The ITAR and EAR are described below.

- *International Trade in Arms Regulations (ITAR)*—the set of regulations built around the AECA dealing primarily with national security and, expressly, defense-related items and services. The products regulated include weapon systems (e.g., aircraft, tanks, etc.) but also include subsystems or components critical to military systems. The determining factors are listed as follows:

    a. Is it specifically designed, developed, configured, adapted, or modified for a military application, and
        - does not have predominant civil applications, and
        - does not have performance equivalent (defined by form, fit and function) to those of an article or service used for civil applications; or

    b. Is it specifically designed, developed, configured, adapted, or modified for a military application, and has significant military or intelligence applicability such that control under this subchapter is necessary? (ITAR, part 120)

As mentioned, this list, and enforcement of it, is controlled by the Department of State. The process of complying with the ITAR is long and rather complicated. Many goods that may not be instantly recognizable as a product controlled under ITAR may, in fact, be subject to the regulations. And fines for violations can be massive—up to $1 million per company per violation, and up to $250,000 per person per violation, as well as up to 10 years in prison (Buetow, 2005). With these stiff penalties, even the smallest infraction can become a major problem for companies.

In order to remain in compliance when exporting products that potentially fall under ITAR regulations, the exporter is required to navigate a demanding licensing process that can take a significant amount of time and resources. These licenses are issued for the item, not for the order; thus, "on a single purchase order some products may require a license while others do not" (Cheadle, 2005, p. 80).

Roomba runs into walls

The *Roomba* is a civilian robotic device designed to carry out a task disliked by many people—vacuuming the floor. This commercial product is made by iRobot, an American corporation that generated more than $465 million in revenue in 2011 and also makes robots for use by the military. These military robots are used to perform reconnaissance, bomb disposal, and other dangerous missions for troops and first responders.

As part of the design for some of the more advanced Roomba models, a navigation chip is used to help guide it around the home. This chip, derived from chips used in the other products with military applications, was, at first, believed to be non-exportable and exports of the Roomba were halted, until it could be further studied. It was, eventually cleared for export without a license, in part due to changes to the design. However, this case illustrates that even a home cleaning robot can be targeted under existing regulations, illustrating the extent and impact of current export policies.

Moreover, the list, known as the U.S. Munitions List (USML), is not a list of products so much as a list of categories, descriptions, and rules to determine whether or not a product should be controlled. For example, one such category is major weapons systems. Note, however, that the category includes "all components used in the items covered by this category if they were specifically developed or modified for military applications" (USML, Part 121). Often, the State Department has to conduct a lengthy review in order to determine whether the component in question was initially created for a specific military use. The State Department will also attempt to determine whether the end product is for "military use," that is, will "be used in a military way for offensive or defensive purposes" (Cheadle, 2005, p. 82).

Pratt & Whitney contributes to China's first attack helicopter

It may seem that these regulations, though cumbersome and inefficient, at least provide multiple layers of overlapping protection. That a civilian vacuum cleaner is subject to export regulations in order to protect national security can be chalked up to a "better safe than sorry" mentality. Unfortunately, this is not the case. In some instances, export regulations fail to protect U.S. national interests. Between 2001 and 2002, Pratt & Whitney sold engines to China claiming that they would be used to power civilian helicopters. The results of a joint American–Canadian investigation revealed that Pratt & Whitney executives knew full well that the engines would be used on attack helicopters, contrary to the provisions of the existing arms embargo. Apparently, Pratt & Whitney employees working directly on the project were kept in the dark. Company engineers visiting China in 2003 were astounded that the helicopters did not appear to be designed for passengers (the helicopters had only two seats). Internal warnings sent up the chain of command were ignored and later covered up (Toombs & Smith, 2012). In 2012, Pratt & Whitney and two of its subsidiaries (one based in the United States and the other in Canada) were fined a total of $75 million as part of a settlement with the State and Justice Departments for their contribution to the design of what would become China's first attack helicopter. Pratt & Whitney was not debarred, suspended, or in any other way restricted from seeking future government contracts. For a company earning $58 billion a year in revenue, the small fine hardly serves to deter future noncompliance.

Sometimes, it may not be clear whether an item is covered by the USML. In order to help make a determination, an exporter can request a Commodity Jurisdiction (CJ) letter. The exporter submits a detailed technical description of the item to the State Department, which, in turn, conducts a cross-agency review to determine whether it, or the Commerce Department, has jurisdiction over the product in question. The final result is a CJ letter, which informs the exporter which agency, if any, has the authority to regulate the item.

- *Export Administration Regulations (EAR)*—regulations governed by the DoC's Bureau of Industry and Security (BIS) fall under the Commerce Control List (CCL). The EAR, unlike ITAR, is focused on dual-use products and classified under both the CCL and the anti-boycott provisions of the EAA. The BIS uses a simpler set of rules than does the State Department to determine licensing requirements for commercial items.

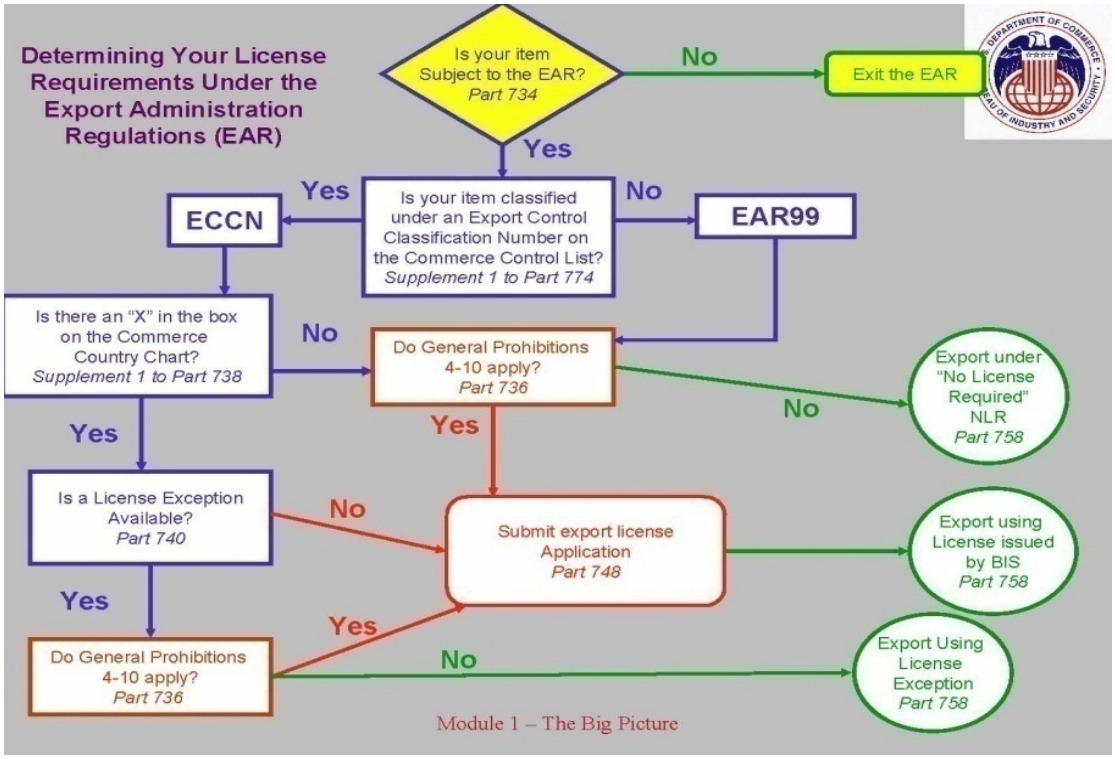

Figure 2. BIS Flow Chart

In order for the exporter to obtain a preliminary assessment, the BIS provides a flowchart that walks one through the process of determining licensing requirements (see Figure 2).

"The flowchart contains steps covering commodity classification; 'bad guy and country' checklist reviews; and whether an export license is required" (Cheadle, 2005, p. 84).

In order to grant a license, the Commerce Department carries out an inter-departmental process wherein the Department carries out the evaluation but with the input and support of other agencies, in particular, the Departments of State, Defense, and Energy. If no outside agency input is needed, the DoC can either inform the applicant that a license is not required, or approve or deny the request. Should the Commerce Department determine that another agency's review is necessary, there is a timeline for the agency to return its recommendation. Within 10 days, the agency may request further information or details; within 30 days, the agency needs to either recommend approval or denial of the license. If it chooses to give no feedback, the agency is seen as having no objection to whatever decision the BIS/Commerce Department chooses (Fergusson, 2005).

There is also a three-part process by which the previous licensing decision can be disputed. First, one can appeal to the Operating Committee, staffed by representatives of the Departments of Commerce, State, Defense, and Energy, as well as representatives from the Joint Chiefs of Staff and the Intelligence Community. Next, one can appeal to the Advisory Committee of Export Policy, consisting of the Assistant Secretary of Commerce for Export Administration, the chair, and the appropriate assistant secretaries and officials from the aforementioned departments. Then, the matter can be brought before the Export Administration Review Board; chaired by the Secretary of Commerce and consisting of the Secretaries of State, Defense, and Energy, as well as having the Chairman of the Joint Chiefs of Staff and Director of Central Intelligence as non-voting members. Finally, should this not resolve the dispute, the President may make a final decision. For each level of appeal, there is a time limit on how much time is allowed; the one exception is the presidential decision. In total, everything short of a presidential decision should take no more than 90 days (Fergusson, 2005).

Chrysler incentivized to rely on foreign components

Technologically advanced products are not the only area where ITAR and EAR restrictions can slow business. When asked in 2001 why Chrysler had issued a memo recommending that engineers "design out" American components in its cars, the CEO of the company gave David Oliver, the then-Principal Deputy Under Secretary of Defense for Acquisition and Technology, a two-inch thick stack of papers with about 70 lines per paper and indicated that each line was a particular chemical controlled by the U.S. government and necessary to produce cars. Although the CEO said he would prefer to purchase common chemicals such as sulfuric acid from the United States because they are cheaper and purer, the export licenses needed in order to export the cars—which take four to six months to obtain and are needed for each chemical order—slow the company's production capability significantly (Oliver, 2001).

Indeed, it seems that the negative consequences extend far beyond damage to defense contractors and firms dealing in high-tech products. Oliver (2001) wrote that the current regime "does not discriminate between items of possible concern and general industrial products" (Oliver, 2001, p. 4).

Import Restrictions

The United States does not use restrictions on imports in the same way as on exports. Rather than rely on lists, the restrictions are based on the expressed preference for American goods over imported goods, particularly in a few classes. Also, unlike export restriction laws, which have evolved significantly over time, to the point where their original content is practically undetectable, import restrictions have undergone less tumultuous changes; in fact, the original laws are still largely in effect. These laws are also not as complex as export control laws, but pertain to a far greater number of items. Below, we describe the two primary import restriction laws, the Buy American Act and the Berry Amendment.

The Buy American Act

The Buy American Act, passed in 1933, was rooted in the belief that by increasing the government purchase of domestic goods, the United States could lift itself out of the Great Depression. As its name implies, the act gave preferential treatment to the use of American-made products. Today, the act contains three original sections and two additional ones.

Figure 3. Buy American Act

Section 1 requires that when procuring materials and manufactured items for public use, the items in question must be American-made unless the cost is unreasonable; the item is to be used outside of the United States; domestic supplies are not available in sufficient quantity or quality; or if purchasing the item domestically might somehow oppose the public interest. The determination of whether or not one of these exceptions applies is at the discretion of the agency head. However, the cost consideration is dictated by a 1934 Treasury Department directive, which defines "unreasonable" as a minimum of 25% over the cost of the foreign product (Hirschman, 1998, p. 10).

Section 2 targets contractors rather than the government. It stipulates that when performing "construction, alteration, and repair work, on public buildings or public work," American materials must be used (Hirschman, 1998, p. 11). As with the agency restrictions, there are exemptions for cost and public interest. Again, interpreting and imposing these exceptions is at the determination of the agency head. Should a contractor violate this section, however, the penalty is debarment for three years.

Section 3 merely defines the terms used in other sections of the law. Section 4 was a later addition to the law, passed in 1949, to clarify intent. This section reiterates that the use of domestic materials is a requirement, unless an exception is granted. It also states that domestic goods manufactured using foreign raw materials are equal (with regard to the law) to those made with domestic materials if, and when, domestic materials are not available. However, this section failed to clarify the definition of "public interest," a term that many agency heads found difficult to interpret, let alone to apply (Hirschman, 1998).

The final section consisted of an executive order from President Eisenhower and is considered to be the act's "most significant and practical alteration" (Hirschman, 1998, p. 12). Executive Order 10582 established interpretation guidelines for use when applying the Buy American Act to contract actions, largely considered the important missing piece. Rather than each agency relying on its own interpretation of the regulations, Section 5 standardized numerous terms. For example, the term "foreign made" was defined as any item for which 50% of its value originates from abroad. It also reinforced the authority of the head of the agency to determine whether accepting a domestic bid over a foreign one might harm the national interest. Section 5 also granted special consideration to 'small business concerns' and suppliers who will 'produce substantially all' of their product in a labor-surplus area" (Hirschman, 1998, p. 14).

Reviews of the Buy American Act are mixed. Although some see it as a necessary step toward protecting American business, others do not think it has worked as intended. Says Hirschman (1998), "The Buy American Act appears to have been poorly planned, hastily passed, and inconsistently enforced" (p. 23). Hirschman largely blames poor definitions, lack of standard rules, and general vagueness. Indeed, many companies find it difficult to interpret the regulations. For example, in 2011, Home Depot was sued by its competitors for allegedly selling Chinese goods (such as power tools) to the United States government, in contradiction of the Buy American Act. Home Depot, for its part, rejected the claims, saying if they did sell foreign goods it was unintentional, but this still prompted an investigation (Little, 2011).

The Berry Amendment

Another statute related to the government procurement of foreign goods is the Berry Amendment. While the Buy American Act gives preference to domestic products over foreign products with certain exceptions, the Berry Amendment overrides these exceptions for particular items, namely food, clothing, and specialty metals. However, whereas the Buy American Act applies to all government contracting, the Berry Amendment applies only to defense contracting. In addition, whereas the act covers only procurement within the United States, the Berry

Figure 4: Berry Amendment Compliance

Amendment is enforced worldwide. Finally, unlike the Buy American Act, which defines the term "substantially all" as no more than 50% of a product, the Amendment requires that 100% of the product be American made (Grasso, 2005).

In force since 1941, the Berry Amendment was actually an amendment to the Fifth Supplemental Defense Department Appropriations Act and has been altered multiple times since. This regulation maintains that the DoD "give preference in procurement to domestically produced, manufactured, or homegrown products; notably food, clothing, fabrics, and specialty metals" (Grasso, 2005, p. i). However, exceptions were later added when food, specialty metals, and measuring tools were used for contingency operations and in instances of compelling urgency (Grasso, 2005).

The Berry Amendment requires that certain items be from domestic sources; however, this requirement extends to all of the item's components as well. Accordingly, clothing, explicitly listed as a controlled item, must be produced in the United States, as must all of the cotton or other cloth materials, natural or synthetic, that are part of the product. This regulation goes beyond clothing; for example, if the DoD is trying to obtain cotton swabs, then the cotton must be of American origin. The requirement applies to the items being grown, reprocessed, reused, and produced.

Acquisition officials must consider the Berry Amendment for every single acquisition. This includes requesting confirmation from the vendor that the material, component, or system is compliant, and they must maintain a written record of this confirmation, should problems arise. Ensuring that the contractor fully understands the requirements and rules of the Berry Amendment is critical to its effectiveness. Once the contract is awarded, DoD officials can continue to monitor the project and remind the vendors of the risks (namely, cancellation of the contract, debarment, and legal action) if noncompliance is discovered. In the case of noncompliance, various actions must be taken, including notifying legal counsel, verifying that a violation has occurred, and suspending payment for non-compliant goods.

Foreign manufacture of berets draws protest

In the fall of 2000, the U.S. Army announced their intention to make black berets the official headgear for all service members in their branch. In the process of ordering 4.7 million one-piece black berets, the DoD decided to hire several companies, including Bancroft, the long-time American producer of military headgear, and several foreign manufacturing firms. Even Bancroft, however, used foreign materials in their production. As a result, the Defense Logistics Agency (DLA) offered two waivers to allow these purchases upon determining that domestic sources alone could not supply sufficient quantity within the quick deadline a few months later. Specifically, the DLA allowed 1) the purchase of the berets from foreign sources and 2) Bancroft to maintain its contract despite using foreign materials (Grasso, 2005).

This whole process—particularly the waivers—drew the ire of the American business and manufacturing community. Several Congressional committees held hearings to determine whether any regulations had been violated in the acquisition, with numerous small business and other groups protesting the decision. They claimed that, although the acquisition of "berets is viewed as a relatively minor matter, when compared to where it purchases its electronics, specialty metals, and other more significant purchases, for many businesspeople in that trade the loss of potential business is devastating" (Grasso, 2005).

The Berry Amendment, however, does not always apply. First, when a purchase falls under the Simplified Acquisition Threshold—currently set at $150,000 (Electronic Code of Federal Regulations, 2012)—a one-time purchase from a prime contractor typically qualifies for an exemption. Second, when goods are not available in sufficient quantities at the domestic market price, the Non-Availability Exception may be invoked, although requirements for the exception must be narrowly defined. Third, foreign procurements for current combat operations (presently limited to the Middle East and Afghanistan) are exempt from all restrictions under the Berry Amendment. Fourth, contingency operations (operations in which the Secretary of Defense determines that American troops might see combat as part of an operation) are exempt from Berry Amendment controls as they relate to food and measuring tools. Fifth, emergency acquisitions (again restricted to food and hand or measuring tools) and "urgent and compelling" acquisitions are exempt from Berry Amendment requirements. Sixth, vessels in foreign waters

are exempt from the restrictions. Seventh, goods meant for commissary resale, including at stores on bases and on-board ships, are exempt. Eighth, qualifying countries can sell their specified goods to the DoD without restriction.

Food items also carry their own exemptions. First, perishable food traveling to overseas locations is exempt from the Berry Amendment controls for obvious logistical reasons. Second, processed foods may have components of foreign or unknown origins, although "significant processing" must have occurred in the United States.

Summary

Current laws have proven quite effective in providing a reasonable level of control over certain technologies and information by stemming the flow of American defense technology to other countries. These laws have also successfully isolated certain countries and prevented them from acquiring weapons that could hurt American interests, while granting our close allies significant access to our technology and expertise to enhance their own defense, and to help us fighting together in a coalition.

The current regime has also allowed the United States to retain certain technologies solely for its own use. Obviously, this is, in part, due to the classified nature of some projects. Take, for example, the top-secret, stealthy Black Hawk helicopter, the existence of which was only publicly known after a technical malfunction that caused it to crash during the military raid on Osama bin Laden's compound in Pakistan (Ross, 2011). The helicopter was only partially destroyed. At the same time, however, agencies often withhold licenses for certain products or specifically ban the export of certain items or information. Even though we trust our allies with a number of controlled items, some items, however, are simply believed to be too sensitive. Often, export restrictions are only applied to components within a system; for example, new technology used in American fighter jets may be subject to export restriction. The United States will use the technology in the U.S. procured aircraft; however, countries wishing to purchase the aircraft would receive versions that use an alternative, more common technology.

Some items, although not intended for general distribution, are sold to our allies and friends. Even though we sell them for their use, we would not want them to be later transferred to an enemy or a competitor who might then use, or threaten to use, these technologies against us or our allies; or gain knowledge to exploit weaknesses in American systems. The current regime has evolved to include stipulations against transfers to third parties without authorization.

Current laws can be applied in order to cut off and isolate countries that violate norms or pose a threat. Under ITAR and EAR, sales contracts on some goods, in addition to the requirement that retransfer be approved, will specifically state that some countries are off limits. IEEPA has been used to create even more restrictions under the President's authority to restrict commerce in an emergency situation. This power has been used to blacklist certain countries. Examples include the Cuba embargo and the former restrictions on North Korea (which have been partially reinstated).

III. Challenges

Despite the restrictions, our allies are still able to purchase the weapons systems that they need from the United States. In fact, the United States is the largest producer and exporter of defense goods in the world, supplying dozens of countries with a range of defense and military products. On the import side, the United States is capable of designing and manufacturing the vast majority of military systems upon which it relies. However, import restrictions impede the United States' ability to acquire defense-related goods as efficiently and cost-effectively as possible. The problem here is two-fold. The DoD is hampered from acquiring foreign suppliers' products—products that are not only cheaper, but in some instances, technically superior. Secondly, the waiver process complicates matters further, creating needless delays for products that may not even be available domestically. Clearly, the current regime is far from perfect. Below, we discuss some of the more pressing challenges associated with current export and import regulations.

1. Restrictions on dual-use technologies

Much to the chagrin of American business, the ability of American companies to export certain goods, including non-defense goods, has been curtailed significantly. Restrictions on dual use items are particularly troubling. Many such items were initially developed by the military but now are in widespread use, including powerful microchips and computers, but also mundane items, like the metal bolts used to build satellites (Avery, 2012). Many items under ITAR controls are not top-secret technology; rather, they are very similar to commercial non-controlled items. Take, for example, the M1 Abrams tank's brake pads, which are "virtually identical to brake pads for fire trucks;" however, unlike those for fire trucks, the ones designed for tanks were controlled under the USML. Prior to changes to the USML implemented by President Obama in 2010, the brake pads received the same level of protection as the tank itself (Office of the White House Press Secretary, 2010).

Importantly, today in many areas of advanced technology the commercial world is ahead of the defense sector, so the DoD increasingly is adopting many commercial items for incorporation in its defense systems—because of their superior performance (and often, lower costs).

Boeing fined for using a military chip on civilian aircraft

In 2006, Boeing agreed to pay $15 million to settle State Department charges that it violated federal export laws by selling commercial airplanes equipped with a 1-inch diameter "gyrochip" used to maintain an artificial horizon for pilots. At the time, a license was required to export products containing the chip, which was also used on the guidance systems of Maverick missiles. According to the State Department, Boeing "chose to export without authorization" and did so "repeatedly and deliberately" (Department of State, n.d., p. 7). Boeing, for its part, ignored State Department warnings, asserting that the department did not have jurisdiction over civilian technologies (Sullivan, 2005). Between 2000 and 2003, Boeing shipped 97 commercial aircraft containing the chip, 19 of which were destined for China, where the sale of listed defense items is expressly prohibited (Sullivan, 2005).

Boeing has described the chip as "relatively unsophisticated" (Gates, 2005). It appears that the State Department agrees with Boeing's position, at least as of late. Two years after the last aircraft were delivered, the State Department conceded that Boeing could export the technology, provided that it was used for civilian rather than military purposes. Meanwhile, the chip is still being used on Maverick missiles.

While there may be no excuse for Boeing's seeming disregard for federal law, one has to wonder if the focus on rules and regulations has come to overshadow appeals to common sense. In a telling admission, the State Department asserted that "Boeing showed a blatant disregard for the authority of the department" (Department of State, n.d., p. 7). Note that there was never any mention of a specific threat to America's national security interests.

Ironically, commercial variants of military technology are sometimes more tightly controlled than the military technology itself, or so it appears. A 2008 DoC study indicated that U.S. exports of imaging and sensor products increased significantly from $280 million in 2001 to $462 million in 2005. In 2005, roughly 12% of total revenue was derived from exports. Night-vision devices and *cooled* infrared imaging systems—used predominantly in military systems—were the two largest export categories (Department of Commerce [DoC], 2008). During the same time period, however, the U.S. export of commercial *uncooled* infrared imaging devices declined

precipitously, from $55 million to $20 million (DoC, 2008). The Institute for Defense Analysis (IDA) concluded that "export controls are a negative factor on the competitive position of U.S. firms in this segment" (IDA, 2008, p. 29). Some U.S. companies have stopped exporting certain commercial infrared products altogether. It simply is not worth their effort given foreign customers' "displeasure" with U.S. export controls and the willingness of European firms to meet the foreign demand (IDA, 2008, p. 29). Even if export controls for commercial infrared products are relaxed, there is now some question as to whether the U.S. industry will be able to "catch up" with European suppliers in order to be competitive.

2. Long delays for approval

Business deals with foreign firms involving any type of controlled good or information must be approved in advance. Often, the approval process can take several months. In fact, without the appropriate license, even approaching the foreign firm may be illegal. In some instances, making a telephone call to a foreign company requires pre-approval. Needless to say, many international business opportunities are hindered as a result (Oliver, 2001), which, in turn, diminishes the United States' technological edge, by reducing demand for its high-tech products.

Because the licensing procedures are typically based on whether the product falls on a particular list—and often do not take into account the destination country—even our closest allies are subjected to lengthy licensing procedures that can harm their interests, as well as our own. That only 1% of all export requests are rejected (and far fewer from our allies) indicates that the process may be doing more harm than good. Some countries (e.g., Canada) have long enjoyed a special status that allows them greater access to American defense goods. This status has only recently been extended to the United Kingdom and Australia.

An independent group of DoD advisers (the Task Group on Best Practices for Export Controls) found that the "processes are causing lengthy review times and prompting slow decision-making," which "has a negative impact on the U.S. private sector and foreign governments who desire to trade technology and defense items with the U.S" (Defense Business Board, 2008, p. 2). Moreover, the State Department reportedly uses an all-paper system, and the DoC uses systems

not significantly updated since 1987. It is not surprising that it takes an average of four to six months to process license requests (Defense Industry Daily, 2011).

Navigating complex export regulations can be especially challenging during active, joint military engagements, when materials are urgently necessary. During the NATO mission in Kosovo, for instance, the United States military did not have sufficient base space or munitions and sought to use Italian bases and equipment in order to fully participate in the mission. This made sense, considering that similar missions had been coordinated in the past, often with Italian and American planes flying side-by-side. The greatest threat to these types of joint missions was surface-to-air missiles, against which the best defense was flares ejected from the rear of the aircraft.

The United States produces some of the best flares available. During the mission to Kosovo, Italy sought to purchase flares from the United States, and there was, in fact, a large stockpile already in storage on the base. But because the flares were considered a protected item, approval was required, which was arbitrarily rejected.

3. Fewer opportunities for joint research

The current regime greatly hinders the opportunity to engage in joint research. American institutions are limited, as are foreign employees and students. Combined, these issues are making it harder for the U.S. to have significant technological advancements, thus eroding our previously large technological advantage over our adversaries (Chakrabarti, 2009). Since information is controlled by both ITAR and EAR, new knowledge emerging from American universities can require a license for export. In fact, simply passing the information to a foreign national living in the United States is considered a “deemed export.” Under the current regulations, companies and universities may be required to obtain an export license before releasing controlled dual-use technology, or source code subject to the EAR, to a foreign national who is not a permanent resident of the United States (or a member of certain groups of protected individuals, such as asylum holders). Consequently, the transfer of technology within the U.S., to a foreign national, may be considered an export to his or her home country. As one might imagine, such a status engenders many complications for foreign students who want to study

advanced technology and science. Indeed, even being in a classroom when a controlled technical procedure is discussed, may be considered a violation. As a result, very promising students are deterred from pursuing a technology-focused education in the United States, to the detriment of the American commercial and defense industries. Recognizing the large number of foreign students in the top U.S. research universities (in the science and technology fields), President Reagan decided (in Presidential Decision Directive 189) that "fundamental research" should be open to all, regardless of nationality, and that the research should be freely published, so as to maximize the economic and security benefits.

However, there are still problems when it comes to "applied research." Take, for example, the case of J. Reece Roth, a retired professor from the University of Tennessee. He allegedly shared information he had obtained, while working on an Air Force project, with students in his class from Iran and China. Despite his argument that he was unaware of the violations and unaware that the information was even on the USML, he was convicted and sentenced to four years in jail and two years of probation (Burke, 2012, p. 52).

4. Technology outpaces the regulations

Revisions of the regulations and the control lists are rare, whereas technology advancements are constant and regular. This delay means that the regulations fall even further behind, as technology advances, making the system even more inadequate as time passes. Thus, much of the new technology is not properly protected, and old technology that has become ubiquitous is controlled unnecessarily.

In the modern era, communicating via email can lead to violations of U.S. export policy. When an email is sent from a user in the United States to another user in the United States, the email is routed through central servers. Transit to these servers takes the path of least resistance, which includes transit abroad, since the servers may be located overseas. An email containing an attachment with information on even basic plans for a weapons system can technically result in a violation, despite the fact that both the sender and receiver were located within the United States. (McHale, 2009).

Scientific development in the Soviet Union

The Soviet Union maintained a closed and protected scientific development system for their defense goods. Domestically, military scientific development in the Soviet Union was kept completely separate from civilian development. This went beyond the basic controls the United States uses to restrict dissemination of classified technologies. In the United States, certain elements of cutting-edge technology are, understandably, carefully restricted and disseminated only to those with appropriate clearance; however, scientists working on military projects are not only allowed, but encouraged, to interact with fellow U.S. scientists, even those that are not in possession of a clearance, regarding the more general aspects of the project. In the Soviet Union, however, the scientists working on secret technologies were sequestered, unable to interact with fellow scientists to discuss new scientific discoveries. In effect, the military scientists were part of a unique scientific community. This arrangement ultimately stifled innovation, both in the private and military arenas, and led to less significant development.

Internationally, the military scientists were even more restricted. While other scientists working on civilian projects were allowed to attend international conferences, publish their work, and discuss scientific developments with their colleagues, military scientists were completely cut off from the international scientific community; in fact, many were not allowed to travel internationally at all.

The Soviet policy was detrimental to scientific innovation. First, the separation of civilian and military scientific developments led to a loss of cooperation that is necessary to foster the best scientific developments. Moreover, the restrictions led to less qualified scientists working on military projects because, for the reasons mentioned above, working on military projects was less desirable than working on civilian projects. Although, the United States does not protect information (or its scientists) to the same extent, it is plausible that even a gradation of these restrictions could adversely impact the success of military programs.

5. Regulations damage relationships with allies

The current regime may be hurting U.S. relationships with allies. Oliver (2001) notes that "Potential allies do not view restricting technology that would enable their citizens to have a higher standard of living or more security as the act of an America who wants to have friends" (p. 5). Our allies may resent when we require that they obtain licenses—let alone when we reject them—because these actions hinder their ability to develop, from both an economic and security perspective (Oliver, 2001).

6. Lack of competition results in higher prices

Import regulations have been successful in their stated purpose of limiting the use of foreign products in government contracting. The primary goal of the import control system—protection of American manufacturers and producers of certain goods from foreign competition—has, in a sense, been successful in that it has supported American businesses that would otherwise lose contracts to imported goods that are often cheaper, better, or both. But the policies have had unintended consequences. For instance, the cost of hiring contractors is significantly higher than might otherwise be the case, because of the lack of competition from abroad. In addition, foreign technologies are not always inferior to those built in America.

Rather than rely on Russian rockets, NASA starts from scratch

During a 2003 congressional hearing before the Subcommittee on Space and Aeronautics on "U.S.-Russian Cooperation in Space," the chairman of the Subcommittee, Congressman Dana Rohrabacher questioned why NASA was planning to spend "up to $350 million over the next five years in developing a new rocket engine that is arguably less efficient than a rocket engine already available … at a cheap price from the Russians." The rocket would be used on the Space Launch System (SLS), the first vehicle designed to fly astronauts beyond Earth orbit since the Apollo era. Rohrabacher asserted that the Russians had already made significant investments in rocket technology, dating back to the Cold War years. At one point during the hearing, Rohrabacher asked then-NASA Chief of Staff Daniel Schumacher "why is it that we should be spending … our development money to develop what the Russians already have?" Schumacher evaded the question, responding only that the Russians would be able to bid on the contract.

Rohrabacher followed up, asking whether a Russian bid was even permissible under the nonproliferation legislation that was in place barring the import of goods that could be used to deliver a nuclear attack. Schumacher responded in noncommittal fashion, stating that "it doesn't appear to be human space flight related, [so] we would think they could compete and go forth." Rohrabacher was clearly not pleased with the Chief of Staff's response: "That is fascinating. That is interesting. All right. I— let me note that … we are talking about limiting our ability to take or partake of Russian technology for our financial benefit and our ability to get the job done."

It should be noted that prior to this hearing, in 2002, Lockheed Martin had completed the maiden launch of its Atlas V vehicle. The vehicle uses the RD-180 first stage engine built by Energomash, a Russian company. It is unclear why NASA did not embrace the use of Russian engines for its SLS program. To date, Russia has not participated on the SLS program, nor have any Russian rocket engines been purchased.

7. Interruptions in the supply chain

A 2004 study by the Office of the Deputy Under Secretary of Defense for Industrial Policy examined 12 major DoD programs and found that 4.3% of the value of the contracts came from foreign subcontractors. In fact, every U.S. weapon system contained some foreign parts. It

should be noted that the foreign parts were used not because they were cheaper (although they often were) but because they were better. Additionally, in contradiction to the aforementioned concerns, the report states that this finding has "not negatively impacted long-term readiness or national security" (Office of the Under Secretary of Defense for Industrial Policy, 2004, p. v). Instead, the report cites it as a benefit, as it allows the DoD to access foreign technologies, encourages interoperable systems with allies, improves foreign access for U.S. firms, and ensures competition that helps American industry innovate (Office of the Under Secretary of Defense for Industrial Policy, 2004, p. v). Not all authors on this subject agree, however, that the military's use of foreign parts is necessarily beneficial. Foreign dependency could be construed as a potential risk to American security. According to the Defense Science Board, all DoD purchases have "some commercial or foreign parts" (Defense Science Board Task Force on Integrating Commercial Systems into the DOD, Effectively and Efficiently, 2009, p. xiii). Clearly, the interruption of availability of foreign parts due to international events is potential cause for concern. However, this is generally mitigated by the fact that these suppliers are allies (e.g., the top five suppliers of aerospace imports in 2011, which account for over 70%, are France, Canada, the U.K., Japan, and Germany; International Trade Administration, 2011). As for other suppliers, the United States could stockpile adequate quantities of parts and materials so as to minimize the impact of any interruptions.

8. Increasing cybersecurity threats

Virtually all weapon system components, as well as business systems use software extensively. Moreover, software development is now also a global industry, and some of the software used by the DoD and the defense industry has been, at least in part, developed abroad. This can include countries that may be motivated to exploit and/or manipulate software. This can potentially result in the theft of information and intellectual property, the destruction of information systems, or even the destruction of a physical system.

For example, the National Center for Computational Engineering at the University of Tennessee recently purchased technology from Huawei, a Chinese technology firm with close ties to the People's Liberation Army. This lab works directly on national security issues, conducting simulated flight tests for both military aircraft and spacecraft, as well as simulating submarine

warfare. Clearly, this type of information, if acquired by peer competitors, could be exploited in a variety of ways. In fact, the U.S. government had reason to believe that Huawei had the capability to capture this information through imbedded components of the system that were sold to the University. Moreover, a House Intelligence Committee report claimed that Huawei and fellow Chinese company, ZTE, had engaged in espionage of this sort in the past (Schmidt, Bradsher, & Hauser, 2012).

Beyond the cybersecurity risk, economic risks were also an important factor to those who were protesting this use of Huawei technology. The company, the House report noted, received substantial subsidies from the Chinese government, providing it with a substantial advantage over other leading U.S. competitors, like Cisco Systems.

IV. Recommendations

There is a clear need for both import and export controls; however, the current system definitely has significant flaws that negatively impact economic growth and national security. Correcting these issues requires a strong plan of action to revamp and re-imagine the control system. Import and export controls are clearly necessary in order to ensure the protection of American military technology as well as the health of the defense industry. However, the current regime must be revised to take advantage of the globalized economy while addressing the challenges cited in the previous section. Below, we provide our recommendations.

- The lists of regulated items should be combined and simplified.

  Exporters are not always sure whether their product is on the USML, the CCL, or regulated through some other mechanism, creating confusion and errors. A master list would greatly aid the process. Creating a single list would require significant commitment on the part of the U.S. government. All redundancies would have to be eliminated. First, however, policymakers would have to determine which items actually require protection. The removal of thousands of items will act to free up some of the backlog in the system, thereby facilitating the creation of a new list. However, the list must be frequently updated to take care of the rapidly changing situations (e.g., regarding technology, available for foreign goods, etc.).

- Defense-related items should be assigned to categories based on their level of sensitivity.

  Presently, all items are treated equally. This results in tank brake pads, identical to those used on fire trucks, being controlled just as stringently as the tank's complex targeting systems or the entire tank itself. This distracts from protecting goods that could actually impact national security.

  Policymakers should consider creating a system similar to security clearances for domestic national security workers. Items on the newly merged USML/CCL could be given a designation for a level of protection, similar to the classification of government

documents, which includes the categories top secret, secret, confidential, and unclassified.

- Export decisions should be based, in part, on the status of a country's relationship with the United States.

  Our close allies, such as Britain, France, Australia, the Netherlands, and so forth, should not be required to navigate an onerous process in order to obtain licenses for each and every defense-related product that they order from the United States. As previously discussed, current policy hampers our relationship with our allies, fosters resentment, and reduces our allies' desire to share technology developments with us. Because the overwhelming majority of licenses requested are from U.S. allies, and for items that are not particularly risky, this would free up significant resources necessary to expedite the approval of other licenses, which will make exporting more efficient overall. And, because almost all of the license requests of this type are already being approved, this policy would not create significant security vulnerabilities.

  Corresponding to the designations assigned to "defense-related goods," countries should be assigned to categories based on the status of their relationship (e.g., most trusted, trusted, less trusted, least trusted) with the United States. To borrow from the security clearance scheme once again, an individual with a secret clearance can only gain access to documents marked secret or below. (Perhaps for geopolitical sensitivity reasons this could be coded as category A, B, C, or D—and used as an incentive for countries to control their third country exports, for example.) Similarly, a country with a mid-level clearance could import items of certain designations without a license. Under this type of system, countries would be able to understand what will be required to import certain goods from the U.S. prior to beginning what is today a long and complex process. Under this system, American regulators and lawmakers could allow license-free exports of certain goods to certain countries without allowing open exporting and yet, more carefully controlling which countries can obtain which defense products.

- The United States should not unilaterally impose controls on commercial variants of defense-related goods for which it is not the sole supplier.

  If the United States believes that certain defense-related products should be barred from export, it must seek multilateral participation; otherwise, an embargo that is imposed unilaterally will be ineffective, not to mention costly to American companies. As alluded to earlier, U.S restrictions on the export of commercial infrared devices led to decreased revenues for American firms, while boosting the profits of European firms (for which the export of infrared devices was less restrictive). Needless to say, the world is not safer simply because the U.S. stopped selling commercial infrared devices to foreign buyers.

- Protectionist import restrictions should be eliminated.

  The United States should rely on free-market exchange, not protectionist import policies, to promote and improve America's competitiveness both at home and abroad. Though protectionist policies may benefit certain industry segments, the market distortions that are created lead to higher prices and reduced domestic consumption. Moreover, the industry segments that are protected have less incentive to innovate and reduce their costs. As a consequence, the industries themselves may suffer from their lack of global competitiveness, leading to decreased revenues from foreign sales. The longer protectionist policies are in place, the less competitive the industries will become. Reducing import restrictions would lead to the greater development of weapons systems and their associated products, both in terms of quantity and quality, while spurring economic growth.

  There is also a known link between trade and the decreased likelihood of war. McDonald (2004) writes that there is "substantial empirical support for the proposition that increasing levels of cross-border economic flows … decrease[s] the probability of conflict" (p. 547). One might argue that this link is even stronger within the context of trade in defense-related items.

There are numerous potential roadblocks to implementing these key recommendations. Every lawmaker, regulator, business interest, and foreign country has its own incentives in mind, and thus each has a different perspective on how—or even whether—the import and export regulations should be changed.

Congress is perhaps the most important constituency as it will need to approve of the changes and, ultimately, write them into law. Regional biases will likely come into play, as will specific interests within each congressional district. A Congress member from a district that supplies basic materials to the military, such as textiles, will want to ensure that the Berry Amendment remains in effect, whereas a market-oriented congressman with little stake in the matter may champion the need for federal budget reduction or increased protectionism.

Changes to the export control laws would also elicit various perspectives from members of Congress. For example, a Congress member representing the suburbs of Washington, DC, might be more likely to push for a reduction of export control restrictions. Many of his constituents work for defense contractors and are headquartered in the area. On the other hand, autarkic members may view the issue differently, citing potential for abuse and the unwanted spread of critical American military technology—as opposed to the benefits of deregulation.

V. Conclusion

Our import–export control systems, originally established to protect American security interests, have begun to undermine the economic, technologic, and military capabilities of the United States. Meaningful reform of these systems is required to place the U.S. on a strong strategic (economic and military) footing for the future.

Since the last major revisions of these systems, the world has changed markedly. Whereas the United States was once the unrivaled leader in most technological fields, today it is one of several leaders in many technological fields (and in some fields, the United States lags considerably). The United States can no longer afford to pursue an import–export regime that reduces American access to new technologies while protecting uncompetitive domestic firms and restricting leading U.S. companies from pursuing foreign sales abroad. To be sure, certain technologies must be protected. But, the best way to ensure that this occurs is by reducing the scale and scope of the current restrictions so that attention can be focused on specific technologies, the protection of which is vital to U.S. security interests.

The administration has recently taken steps to update how the U.S. government protects sensitive technologies and regulates exports of munitions and commercial items with military applications. These rules will affect items regulated for export under two categories on the USML (Aircraft and Associated Equipment and Gas Turbine Engines). Both of these categories are extremely important to the aerospace industry and represent more than $20 billion in annual exports. There are plans to continue the reviews and reform the remaining 17 categories of the USML categories. This is certainly a step in the right direction (Department of State, Office of the Spokesperson, 2013). The failure to reorient our priorities in the new global environment will only lead to technological decline and obsolescence in certain industry segments. Technological decline, and the economic decline that it portends, are the true threats to America's security.

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About the Authors

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The Honorable Jacques S. Gansler, former Under Secretary of Defense for Acquisition, Technology, and Logistics, is a professor and holds the Roger C. Lipitz Chair in Public Policy and Private Enterprise in the School of Public Policy, University of Maryland; he is also the Director of the Center for Public Policy and Private Enterprise. As the third-ranking civilian at the Pentagon from 1997–2001, Dr. Gansler was responsible for all research and development, acquisition reform, logistics, advance technology, environmental security, defense industry, and numerous other security programs. Before joining the Clinton Administration, Dr. Gansler held a variety of positions in government and the private sector, including Deputy Assistant Secretary of Defense (Materiel Acquisition), Assistant Director of Defense Research and Engineering (Electronics), Senior Vice President at TASC, Vice President of ITT, and engineering and management positions with Singer and Raytheon Corporations.

Throughout his career, Dr. Gansler has written, published, testified, and taught on subjects related to his work. He is the author of five books and over 100 articles. His most recent book is *Democracy's Arsenal: Creating a 21st Century Defense Industry* (MIT Press, 2011).

In 2007, Dr. Gansler served as the Chair of the Secretary of the Army's Commission on Contracting and Program Management for Army Expeditionary Forces. He is a member of the Defense Science Board and the Government Accountability Office (GAO) Advisory Board. He is also a member of the National Academy of Engineering and a fellow of the National Academy of Public Administration. Additionally, he is the Glenn L. Martin Institute Fellow of Engineering at the A. James Clarke School of Engineering; an affiliate faculty member at the Robert H. Smith School of Business; and a senior fellow at the James MacGregor Burns Academy of Leadership (all at the University of Maryland). From 2003–2004, Dr. Gansler served as Interim Dean of the School of Public Policy at the University of Maryland; and from 2004–2006, he served as Vice President for Research at the University of Maryland.

William Lucyshyn

William Lucyshyn is the Director of Research and a senior research scholar at the Center for Public Policy and Private Enterprise in the School of Public Policy at the University of Maryland. In this position, he directs research on critical policy issues related to the increasingly complex problems associated with improving public-sector management and operations, and with how government works with private enterprise.

His current projects include modernizing government supply-chain management, identifying government sourcing and acquisition best practices, and analyzing Department of Defense business modernization and transformation. Previously, Mr. Lucyshyn served as a program manager and the Principal Technical Advisor to the Director of the Defense Advanced Research Projects Agency (DARPA) on the identification, selection, research, development, and prototype production of advanced technology projects.

Prior to joining DARPA, Mr. Lucyshyn completed a 25-year career in the U.S. Air Force. Mr. Lucyshyn received his bachelor's degree in engineering science from the City University of New York and earned his master's degree in nuclear engineering from the Air Force Institute of Technology. He has authored numerous reports, book chapters, and journal articles.

The Center for Public Policy and Private Enterprise provides the strategic linkage between the public and private sector to develop and improve solutions to increasingly complex problems associated with the delivery of public services — a responsibility increasingly shared by both sectors. Operating at the nexus of public and private interests, the Center researches, develops, and promotes best practices; develops policy recommendations; and strives to influence senior decision-makers toward improved government and industry results. The Center for Public Policy and Private Enterprise is a research Center within the University of Maryland's School of Public Policy.