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A farewell to arms autonomy: an analysis of international arms cooperation in U.S. security alliances in the Post-Cold War era

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BOSTON UNIVERSITY
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Honors Thesis

**A FAREWELL TO ARMS AUTONOMY:
AN ANALYSIS OF INTERNATIONAL ARMS COOPERATION IN U.S.
SECURITY ALLIANCES IN THE POST-COLD WAR ERA**

by

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For Carlos and Leda Monroy, whose selfless dedication and sacrifice has given me the opportunity to live their dream of graduating college.

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1. Introduction

Strategic and military alliances remain essential tools for projecting regional and global power and influence. After the end of the Second World War the United States established itself as a military and economic superpower. In an effort to deter aggression from the Soviet Union, the United States entered into formal and informal agreements with foreign states to preserve and enhance collective defensive capabilities. Such alliances are characterized by extensive military and economic collusion meant to enable the alliance to carry out its mission, whether it is deterrence, collective defense, or foreign intervention. Regardless of the alliance's purpose, acquisition and transfer of military equipment is essential for the duration of the organization's lifetime. As a result, many of the states with which the United States has entered into alliances have maintained some mutually agreed upon system for weapon systems acquisition. For most of the Cold War, this typically meant that the United States would sell American-made weapons systems "off-the-shelf" to allied states for use towards the alliance mission. More recently, however, the United States has seemingly begun to move away from this strategy of arming allies. Arms agreements between the United States and allies towards the end of the Cold War were no longer asymmetric transfers of American produced military equipment to allies. Instead, weapons programs became increasingly internationalized, distributing design and production across two or more allied states.

To what can scholars attribute this recent change in arming strategy? What follows is a qualitative exploration of the mechanisms that influence decision making within alliances, specifically decisions about developing, producing, and distributing

armaments. In security alliances, arms are everything. Arms translate to aggregated capabilities for allies and signals of preparedness to potential adversaries. Arms give allies teeth to take unilateral action in support of the alliance or give it peace of mind and security through acquisition of defensive systems. But because not all alliances are created equal, neither are alliance arms policies. In a complex and anarchic international system, states must consider the ramifications of every action on every aspect, whether strategic, economic, or political, domestic or international. And for a country such as the United States, this means having to balance these factors for each one of its several alliance commitments. The U.S. is sometimes pejoratively referred to as the world's largest arms dealer. This is due, in no small part, to its interactions with its many allies, each with its own unique strategic positioning, economic capacity, and policy agendas. My objective here is to shed some light on a topic that has received little direct attention by scholars of international relations and hopefully provide some new insight into the inner workings of alliance arms policies in a time of ever-changing facts, rules, and players.

2. Theoretical and Empirical Puzzles

This honors thesis will explore two puzzles in contemporary arms acquisition within alliances. The latter half of the twentieth century saw a significant increase in the number of collective arms acquisition projects between two or more states, henceforth referred to as International Arms Cooperation, or IAC.¹ This represents a departure from the conventional methods of arms acquisition, which were mainly the autonomous production of arms within a state or the transfer of fully manufactured arms from one state to another. A prime example of IAC has been the decades long Joint Strike Fighter project, which has seen the United States join in partnership with several NATO and non-NATO allies to produce a fifth-generation stealth fighter jet for use by every participating state.² By far the most popular method of acquiring arms and other defense related goods has been purchasing preexisting platforms from foreign producers. Examples of this method would include a Pentagon approved sale of American-made Lockheed Martin Patriot Advanced Capability-3 missiles to the Kingdom of Saudi Arabia in a deal worth \$5.4 billion.³ Each of these policies have unique ramifications for the overall

¹ Throughout this paper, I will refer to any collaboration in production/development of arms between the U.S. and allied states as international arms cooperation (IAC). Academic literature as well as the Department of Defense maintain a general definition of IAC policies. It is generally thought of as including “all aspects of defense acquisition programs that are jointly conducted with one or more foreign nations or organizations. Facets...include requirements harmonization, RDT&E, production, acquisition, and weapon system support.” Furthermore, these programs are formalized via written agreements. This definition is taken from Deputy Under Secretary of Defense for International and Commercial Programs, 1996, as summarized in a 2002 RAND study, *Going Global: U.S. Government Policy and the Defense Aerospace Industry*. 95.

² Lockheed Martin. *The Centerpiece of 21st Century Global Security*. 2016. <https://www.f35.com/global>.

³ Brendan McGarry. 2015. "Saudi Arabia Requests \$5.4 Billion Worth of PAC-3 Missiles." *DoD Buzz*, July.

functionality and cohesiveness of an alliance. More importantly, each policy is derived from different theoretical assumptions about how the international system functions.

The first puzzle this paper will explore is: why has there been a rise in international arms cooperation in recent decades? Classical realist theory consists of four basic assumptions, that (1) states are the central actors in international politics, (2) the international system is inherently anarchic, (3) all actors are rational, and (4) all states desire power above all else as a means to ensure their self-preservation.⁴ Realist thinkers as far back as Machiavelli have argued strongly against the reliance upon other states for security, instead arguing for the self-sufficient production of all means of military power.⁵ Realist and neorealist ideas have had significant influence on American foreign policy debate since the early twentieth century and have included such proponents as Richard Nixon, Henry Kissinger, and George H.W. Bush.⁶ Considering the amount of influence realism has had on both American debate and policy throughout the twentieth century, the sudden departure in recent decades is puzzling. That realist doctrine stresses an autarkic approach to security is well established and has been followed by U.S. policy for most of its history. Indeed, even in Western countries where markets have been opened to free trade, defense industries have remained protected, in line with these states' strong preference for self-sufficient arms production over reliance on foreign suppliers.⁷ Why, then, the sudden rise in IAC? Do states no longer believe autarkic defense

⁴ Robert E. Goodin, (2010). *The Oxford Handbook of International Relations*. Oxford: Oxford University Press. p. 133.

⁵ Niccolò Machiavelli. 1515. *The Prince*. Translated by W.K. Marriott. New York: Chios Classics.

⁶ Kyle M. Lascurettes. "Realism (International Relations)." *policy* 66 (2002): 878-881.

⁷ Richard A. Bitzinger. "The Globalization of the Arms Industry: The Next Proliferation Challenge." *International Security* (The MIT Press) 19, no. 2 (1994): 172.

production to be integral to their national security or have they engaged in new methods of defense acquisition based on a new calculus of international security?

The second puzzling aspect of the rise of IAC is that it has not occurred uniformly across U.S. alliances. That is, while the U.S. has expanded IAC projects with allies and partners in recent years, this transformation of defense acquisition has not significantly reduced the number of traditional arms agreements in which the U.S. sells existing weapons systems to foreign allies.⁸ The U.S. is party to several collective defense agreements with foreign states. Aside from NATO, these agreements include Australia, the Philippines, Thailand, and Brazil.⁹ The largest IAC project, the F-35, does not include all of these states.¹⁰ If U.S. policy has moved away from self-sufficient defense production, why have we not seen the IAC in all new cases of weapons system acquisition? Why are some states offered opportunities for IAC with the U.S. via licensed production, coproduction, and codevelopment?

Post-Cold War U.S. arms agreements with allies have varied between international arms cooperation and the traditional sale of conventional arms to foreign governments, which remains high today. This paper will explore the underlying causes of this variance in arms arrangements via a focused study of the F-35 Joint Strike Fighter and evaluate the implications that it has for the future of the arms industry, alliances, and international security.

⁸ Time. 2015. "The U.S. Is Still No.1 at Selling Arms to the World." December.

⁹ U.S. State Department. n.d. *U.S. Collective Defense Arrangements*. state.gov/s/l/treaty/collectivedefense/. This list is limited to official agreements of collective defense and does not list all states with which the U.S. conducts arms sales.

¹⁰ Lockheed Martin. *The Centerpiece of 21st Century Global Security*. 2016. <https://www.f35.com/global>.

3. Literature Review

This is an area of international relations scholarship that is lacking in substantive analysis of the subject of international arms cooperation. However, the existing literature does an adequate job of explaining the logic behind different approaches to IAC with respect to each major school of international relations theory. Yet most scholarly arguments suggest a one-size-fits-all theory for alliance arms procurement, whether it is founded in realism or liberalism. That is, they too often assume that U.S. arms policies *should* be identical across all cases. The puzzle is that, in practice, U.S. policy towards alliance defense production is remarkably inconsistent and no one theory can explain this variation in policies from alliance to alliance. Therefore, it is necessary to delve deeper into the makeup of various American alliance systems in order to understand the other underlying factors that are influencing U.S. decision-making.

Classical realist and neorealist literature embraces security alliances as an essential component of the international system.¹¹ More specifically, balance-of-power theory within realism asserts that states are motivated to form alliances when they are threatened by a rising power with greater resources or military capacity.¹² Stephen Walt suggests this represents one of two theories that explain alliance formation. The first, called “balancing,” takes a traditional realist view that states will form alliances when

¹¹ Carl von Clausewitz. *On War*. Translated by Michael Howard and Peter Paret. Princeton: Princeton University Press, 1832.

¹² Stephen M. Walt. "Alliances: Balancing and Bandwagoning." In *International Politics: Enduring Concepts and Contemporary Issues*, by Robert J. Art and Robert Jervis, 110. New York: Pearson/Longman, 2005.

faced with a common external threat. In a world where balancing is the dominant behavior, states are more secure because aggressive behavior is deterred. However, according to the second hypothesis, called “bandwagoning,” states are motivated to align with the more threatening state in order to avoid being conquered. In a world where bandwagoning is the dominant behavior, states are less secure because weaker states will align themselves with the stronger power, thus encouraging aggressive behavior.¹³ Applied to alliance weapons acquisition, realists would be hesitant to embrace a shared, or international approach to arms procurement because of the security concerns inherent within the balance or power theory.¹⁴ Realists consider all security alliances to be circumstantial, and thus temporary.¹⁵ Sharing sensitive defense technology with other states would be unwise if states readily shift their allegiances over time or as a result of changing circumstances. To circumvent this risk altogether, realism suggests maintaining an autonomous defense industry regardless of circumstance, as it provides states with the greatest security in terms of military readiness.¹⁶ Other key works on alliance pathologies address trade-offs states face in the pursuit of security as well as the general factors that lead states to cooperate on a multitude of issues outside of defense.¹⁷

¹³ Ibid, 113.

¹⁴ For an alternate game theoretic approach to balance-of-power theory, see Bruce Bueno De Mesquita and David Lalman. "International Power Relations and War." In *War and Reason: Domestic and International Imperatives*, 181-218. Yale University Press, 1992.

¹⁵ For a discussion of alliances and security tradeoffs, see Sorokin, Gerald L. "Arms, Alliances, and Security Tradeoffs in Enduring Rivalries." *International Studies Quarterly* 38, no. 3 (1994): 421-46.

¹⁶ Richard A. Bitzinger. "The Globalization of the Arms Industry: The Next Proliferation Challenge." *International Security* (The MIT Press) 19, no. 2 (1994): 170-198.

¹⁷ For analysis of tradeoffs of security alliances see Morrow, James D. "Arms Versus Allies: Trade-Offs in the Search for Security." *International Organization* 47, no. 2 (1993): 207-33. For general discussion of international collaboration see Haas, Ernst B. "Why Collaborate?: Issue-Linkage and International Regimes." *World Politics* 32, no. 3 (1980): 357-405.

Literature dealing specifically with the changing global arms industry began to appear in the early and mid 1990s, likely in response to end of the Cold War and the bipolar international structure. In the U.S. this period was characterized by falling defense budgets and excess industrial capacity within the defense industry.¹⁸ At the same time, the number of IAC projects between states was on the rise. While some of the scholarship on the globalization of the defense industry is particularly enlightening, substantive literature on this topic is sparse. Indeed, much of the literature on the subject that appeared in the 1990s is limited only to the discussion of traditional arms transfers as opposed to cooperative arms development. The same is true of records and data of the global arms industry compiled by governments and other organizations.¹⁹ Nonetheless, the literature of conventional arms sales detail important international security implications.

Richard Bitzinger is one of the first scholars to conduct an in depth investigation into this phenomenon. Until the final decades of the twentieth century, international collaboration in weapons systems was done on an ad hoc basis, seldom laid out in detail through formalized agreements.²⁰ Bitzinger cites a number of factors contributing to the

¹⁸ Eugene Gholz, and Harvey M. Sapolsky. "Restructuring the U.S. Defense Industry." *International Security* 24, no. 3 (1999): 5-51.

¹⁹ The U.S. State Department keeps annual records of global interstate arms transfers via World Military Expenditures and Arms Transfers (WMEAT). Only statistics of traditional measures of arms sales such as exports and imports are recorded, along with some licensed production. As a result, it is not a useful source for IAC projects. No contemporary database of IAC (licensed, coproduced, codeveloped, or otherwise) exists. Richard Bitzinger briefly oversaw the development of a globalized defense project database under the Defense Budget Project (DBP) but it was eventually discontinued after the DBP's incorporation into the Center for Strategic and Budgetary Assessments. As a result, the database only included IAC projects in development until 1995.

²⁰ Richard A. Bitzinger. "The Globalization of the Arms Industry: The Next Proliferation Challenge." *International Security* (The MIT Press) 19, no. 2 (1994): 170.

increased globalization of the defense industry, including the end of the Cold War and rising costs of development of new sophisticated, technologically advanced weaponry.²¹ In response to these factors, he argues that states elect to cooperate on arms production to achieve economic efficiencies by (1) sharing research and development costs; (2) gaining access to innovative foreign technologies; (3) achieving economies of scale in defense production; and (4) breaking into foreign markets.²² In the past the dominant method of globalized defense production was through licensed production in which sell the rights to reproduce existing weapons systems, such as the F-104 fighter.²³ More recently defense production has taken other forms such as coproduction, in which a weapon system produced in a single country is manufactured in foreign states, and codevelopment, in which two or more states share costs throughout the entire research and development process.²⁴ While the U.S. sees various cost saving benefits from IAC there are also potential risks involved with the internationalization of the arms industry. The diffusion of advanced military technology into the global arms market may dampen the military-technological advantages of the West. In addition, the globalized arms industry has helped to revive the defense industries of some developing countries, allowing them to now become arms exporters, further flooding the world with conventional arms.²⁵

²¹ Ibid.

²² Richard A. Bitzinger. "The Globalization of the Arms Industry: The Next Proliferation Challenge." *International Security* (The MIT Press) 19, no. 2 (1994): 174-175.

²³ Ibid, 177.

²⁴ Ibid, 177.

²⁵ Ibid, 190-191.

Some scholars maintain the belief that self-sufficient defense production remains a better option over IAC. Ethan Kapstein argues that IAC is a “second-best solution” to the issue of arms acquisition because it ultimately represents a new form of protectionism.²⁶ Again Kapstein, like many scholars, subscribe to the realist outlook on defense production in that states will always have a preference for autonomous defense production. He analyzes the makeup of the global arms market and develops a matrix of possible state arms acquisition strategies based on two factors, technological assets and financial assets.²⁷ According to this method of analysis, only states with both financial and technological assets will be able to sustain autarkic defense industries; states with only technological assets will codevelop arms; states with only financial assets will coproduce arms; and states with neither technological nor financial assets will import all defense-related goods.²⁸ Codevelopment and coproduction are “second-best solutions” because they replace the pure free market outcomes of the defense industry. Furthermore, collaborative defense projects on the part of U.S. policymakers are proposed as a means to retain foreign market influence, especially in Europe, where defense industries have become advanced enough to compete with American firms.²⁹ The other problem with IAC projects, according to Kapstein, is that state-level commitment and division of costs and labors significantly delays projects by years, which adds more time for other variables such as state strategy and firm capacities to change to the point where the

²⁶ Ethan Barnaby Kapstein. "International Collaboration in Armaments Production: A Second-Best Solution." *Political Science Quarterly* 106, no. 4 (1991): 657-75.

²⁷ *Ibid.*, 659.

²⁸ *Ibid.*, 659-660.

²⁹ *Ibid.*, 659-670.

project loses support.³⁰ Kapstein concludes by arguing that because the U.S. has such significant comparative advantages in the arms market, American policymakers should not give in to pressure to enter into IAC projects, which could exacerbate the proliferation of advanced conventional weaponry around the world.³¹

Critics of Kapstein's argument would point out that, in an open global economy, the opportunity costs of autonomous defense production are greater than the benefits of supply-side security. To this point, Jonathan Caverley argues that states do not necessarily have to make a choice between security and technological competitiveness and that large states like the U.S. benefit from the market influence gained from defense industry openness.³² The domination of the defense market by American firms is what makes this possible. The lopsidedness of U.S. market power, Caverley argues, "has a pacifying effect...because it extends U.S. power more cheaply than conquest."³³ As more and more states become dependent on American firms for their defense-related goods, the more difficult it will be for states to counterbalance against the U.S, as they would most certainly face supply cutoffs.³⁴

Stephen Brooks is one of the few scholars to focus specifically on IAC arms acquisition and puts forward the argument that globalization of the defense industry increases economic integration and interdependence, making conflict less likely. In

³⁰ Ibid. 660-651

³¹ Ibid, 674-675. For a detailed analysis of diffusion of technology, see Keith Krause. "The Political Economy of the International Arms Transfer System: The Diffusion of Military Technique via Arms Transfers." *International Journal* 45, no. 3 (1990): 687-722.

³² Jonathan D. Caverley. "United States Hegemony and the New Economics of Defense." *Security Studies* (Taylor and Francis Group, LLC) 16, no. 4 (2007): 598-614.

³³ Caverley 2007, 599

³⁴ Caverley 2007, 611

addition, the U.S. defense industry benefited from the access to new technological innovations as a result of increased international cooperation. He concludes that the benefits of a globalized arms industry to the U.S. are so massive in terms of reducing costs, gaining technology, and achieving economies of scale, that it would be unlikely for the U.S. to attempt to restrict foreign influence via protectionist policies.³⁵ Instead, the U.S. will continue to take advantage of the benefits of a globalized defense industry in order to address falling domestic investment in defense.³⁶

Works that present an in-depth analysis of the growing trend of globalization of the arms industry are rare across the existing literature, as it reflects a very recent trend in international relations. Most works address the arms industry through the lens of traditional arms transfers without paying close attention to the recent rise in more collaborative IAC projects. However, they serve to provide insightful implications for how scholars might think about the effects of a changing global arms industry. David Kinsella analyzes the effect that arms transfer dependence has on states' tendencies to instigate armed conflict. He theorizes and proves that when states lacking indigenous defense industries become dependent on one or two foreign powers for defense-related goods, they are more cautious when taking action that may signal aggression. This is because their reliance on a single, or even two, states for security leaves them vulnerable to supply cutoffs via embargoes or other sanctions.³⁷ This is just one of a plethora of works examining the ability of large, industrialized states to project power and leverage

³⁵ Brooks 2005, 126-129.

³⁶ Ibid.

³⁷ David Kinsella. "Arms Transfer Dependence and Foreign Policy Conflict." *Journal of Peace Research* (Sage Publications, Ltd) 35, no. 1 (January 1998): 7-23.

influence over smaller states through the provision of arms. James Morrow writes that strong powers forge alliances with small states in order to gain benefits such as military bases or greater control over the state's policies.³⁸ Small states are willing to make such concessions because they prefer the benefits of security that the large state provides over the maintenance of sovereignty. Also worth noting, however, is the extent to which small states in asymmetric alliances are able to influence the policies of their more powerful counterparts. Robert Keohane details how U.S. foreign policy provides leverage to small allies, as concessions such as bases and naval rights are necessities for American operations.³⁹ While not a substantial part of the literature, it does lay the foundation for understanding the preferences of weak allies and how they might go about seeking them.

As the world's defense industry continues to globalize and IAC projects continue to produce joint weapons systems, the literature will expand to encompass new realities in the international system. This is evident through a number of works on the subject published in more recent years, which expands into a new dimension of arms transfers; that of "socially responsible arms transfers." For example, Jennifer Erickson writes in her book, *Dangerous Trade*, that states sign onto responsible arms trade initiatives even though they provide no tangible gains and instead often impose strict costs on arms exports. They do so out of concern for reputation among the international community that may provide later benefits as well as a confirmation of a particular state's inherent

³⁸ James D. Morrow. "Alliances and Asymmetry: An Alternative to the Capability Aggregation Model of Alliances." *American Journal of Political Science* 35, no. 4 (November 1991): 904-933.

³⁹ Robert O. Keohane. "The Big Influence of Small Allies." *Foreign Policy*, no. 2 (1971): 161-82.

ideological values domestically.⁴⁰ This may also explain instances of strict regulation of dual-use technology exports.⁴¹

While literature regarding specific instances of international arms collaboration is limited, there are some sources worth mentioning. A 1989 paper published by the director of business development of General Dynamics outlined the successes of the company's F-16 fighter jet, which is often cited as the first major instance of international collaboration in heavy armaments. The short evaluation concluded that the F-16 ultimately proved to be a successful international endeavor because of clearly defined minimum purchase commitments by participating countries and because of economic incentives offered via direct and indirect offsets.⁴² There is also limited study of the most recent international arms program, the F-35 Joint Strike Fighter. In 2012, series of articles published in the *International Journal* provided an extensive analysis of the political underpinnings of the program's design and execution. These studies conclude that the F-35's persistent design flaws and cost increases exacerbated already fragile commitments within the partner states, leading to a politically toxic environment for the project and international collaboration in particular.⁴³

⁴⁰ Jennifer L. Erickson. "'Responsible' Arms Transfer Policy and the Politics of Social Reputation." In *Dangerous Trade: Arms Exports, Human Rights, and International Reputation*, 16-43. Columbia University Press, 2015.

⁴¹ For a history of European regulation of dual-use technology, see Ian Davis (2002) *The Regulation of Arms and Dual-Use Exports*. New York: Oxford University Press.

⁴² Robert H. Trice. 1989. "International Cooperation in Military Aircraft Programs." *The DISAM Journal* 75.

⁴³ Srdjan Vucetic and Kim Richard Nossal. "The International Politics of the F-35 Joint Strike Fighter." *International Journal* 68, no. 1 (2012): 3-12.

These studies aside, the general literature remains relatively unresponsive to the increasingly international process of arms production. And works that do explore this topic are often limited to a discussion of the effects of globalized arms production and agreements rather than the causes. Furthermore, these works do very little to address the variance in arming policies between alliances. In this paper, I will attempt to contribute to a small but growing subfield of arms acquisition geopolitics and economics in security alliances.

4. Dependent Variable: Alliance Arming Policy

The dependent variable of this study is the arms acquisition policy pursued within security alliances. U.S. alliance arming policies can be divided into two general categories – arms transfers and international arms cooperation (IAC). Arms transfers involve the sale of preexisting weapons systems from one state to another.⁴⁴ When armaments are purchased directly from the exporting state, the importing state does not contribute to any phase of development or production. The purchasing state does not contribute to any phases of development and merely purchases weapons systems “off the shelf.”⁴⁵ For example, in 2015 the U.S. and India signed an agreement to authorize the sale of pre-existing, American manufactured Apache and Chinook helicopters to the Indian military.⁴⁶

In contrast to direct purchases is international arms cooperation. IAC differs from direct arms transfers as both allies contribute to the development or production of a weapons system to varying degrees.⁴⁷ For example, the development of the AV-8B Harrier II fighter jet, which brought together the American firm McDonnell Douglas and

⁴⁴ While there are other possibilities such as licensed production and coproduction, they can be grouped into one of two preceding groups. There are many forms of joint development. Stephen Brooks further divides collaborative projects based on the level of responsibility allocated to the recipient state. They include licensed production, where receiving states are granted rights to reproduce existing weapons systems, coproduction, where receiving states are included in the joint manufacture of weapons systems, usually for economic reasons, and codevelopment, where multiple firms from multiple participating states collaborate on a weapons system throughout the entire value chain. For research simplicity I will regard licensed production, coproduction, and codevelopment as, together, composing international cooperative arming policy.

⁴⁵ Charles H. Anderton. 1995. *Economics of Arms Trade*. Vol. 1, in *Handbook of Defense Economics*. 524-558.

⁴⁶ The Times of India. "India Inks \$3.1 Billion Deals for Apache and Chinook Helicopters." September 28, 2015.

⁴⁷ Brooks 2005, 82-83.

British Aerospace and Rolls-Royce.⁴⁸ The F-16 fighter jet was also an intensive international collaboration between partner countries that emphasized the use of economic incentives to get foreign governments to commit to the project.⁴⁹ In sum, I am interested in determining what factors lead states to open their previously indigenous defense projects to foreign participation.

⁴⁸ Ibid.

⁴⁹ See Robert H. Trice. 1989. "International Cooperation in Military Aircraft Programs." *The DISAM Journal* 69-76.

5. Independent Variables and Hypotheses

Under what conditions will states engage in IAC projects while others remain forced to import pre-assembled weapons platforms?

My first independent variable is change in alliances' collective defense budgets over time. Defense budgets reflect the annual funds a given country allocates towards national defense and can encompass a variety of aspects such as research, development, production, and maintenance.⁵⁰ The primary function of a security alliance is to provide each member state with credible deterrence towards potential aggressors via aggregate military capabilities.⁵¹ Potential adversaries are deterred from attacking a member state knowing that they would then face the combined strength of the alliance.⁵² Such an alliance maintains credibility as long as the aggregate military power of the member states is strong enough to match that of a hostile state(s).⁵³ One measure of military power is weapons technology, which can be compared side by side with adversaries.⁵⁴ States invest in the latest defense technology in order to maintain credible deterrence, thus keeping the alliance functional. Alliances are able to acquire such weapons systems through collective investment in the alliance. This is most frequently done through states' defense budgets.

⁵⁰ Gordon Adams and Stephen Alexis Cain. "Defense Dilemmas in the 1990s." *International Security* 13, no. 4 (1989): 8.

⁵¹ See Stephen M. Walt 2005

⁵² Glenn Palmer. "Alliance Politics and Issue Areas: Determinants of Defense Spending." *American Journal of Political Science* 34, no. 1 (1990): 191.

⁵³ Ibid.

⁵⁴ James D. Morrow. 1991. "Alliances and Asymmetry: An Alternative to the Capability Aggregation Model of Alliances." *American Journal of Political Science* 35 (4): 904-905.

Defense appropriations are influenced by factors such as geopolitical environment and public opinion.⁵⁵ Increasing threats posed by rival states increases the need for security, which is usually reflected in an increase in state military spending. The same is true for security alliances, just on a larger scale. Member states pool together their military resources to form an aggregate deterrent. As a result, it seems reasonable to expect fluctuations in a state's defense budget over time to contribute to changes in policy preferences when it comes to arms procurement.

Conventional wisdom rooted in realist theory tells us that state defense allocations maintain a positive relationship with threat level. As threat of armed interstate conflict rises, so do defense budgets, and vice-versa.⁵⁶ In addition, larger states tend to have larger defense budgets, which allow more defense-related purchases.⁵⁷ The continued purchasing of military hardware provides domestic suppliers with a stable consumer base. As long as the domestic government maintains large defense budgets, domestic defense firms will sustain themselves with government contracts, which can provide for longer supply runs.⁵⁸

⁵⁵ See Richard C. Eichenberg and Richard Stoll "Representing Defense: Democratic Control of the Defense Budget in the United States and Western Europe." *Journal of Conflict Resolution*, (2003): 47: 399-422 and; Larry M. Bartels. "The American Public's Defense Spending Preferences in the Post-Cold War Era." *The Public Opinion Quarterly* 58, no. 4 (1994): 479-508.

⁵⁶ See Glenn Palmer. "Alliance Politics and Issue Areas: Determinants of Defense Spending." *American Journal of Political Science* 34, no. 1 (1990): 190-211 and William Nordhaus John R. Oneal, and Bruce Russett. "The Effects of the International Security Environment on National Military Expenditures: A Multicountry Study." *International Organization* 66, no. 3 (2012): 491-513.

⁵⁷ Glenn Palmer. "Alliance Politics and Issue Areas: Determinants of Defense Spending." *American Journal of Political Science* 34, no. 1 (1990): 199-200.

⁵⁸ See Jonathan Caverley and Ethan B. Kapstein. "Arms Away: How Washington Squandered Its Monopoly on Weapons Sales." *Foreign Affairs* 91, no. 5 (2012): 125-32.

Longer supply runs are especially tied to government contracts for technologically sophisticated weapons systems, such as aircraft.⁵⁹ These arms often require massive upfront costs in research and development.⁶⁰ In periods when perceived threat is high, large states are willing to invest the necessary financial assets into the defense industry, increasing defense budgets. However, when defense budgets decrease, there are less funds available for technology-heavy armaments, making it difficult for firms to maintain the economies of scale necessary for the production of such goods.⁶¹ In addition, per unit costs of arms are driven up as the number of units produced begins to fall in response to decreased demand.⁶²

Shrinking defense budgets and the increased initial costs associated with cutting-edge weapons systems creates an incentive for states to find ways to reduce the cost of acquiring arms. Since states in alliances share common geopolitical and strategic interests, it makes sense to move toward a more integrated approach to arms acquisition. There are several advantages to international arms cooperation. First, it allows states within an alliance to share the burden of heavy upfront costs of investing in research and development, thus reducing financial risk for governments. Second, collaboration increases the market for these arms, as it is no longer dependent on the domestic demand of one state. The increased consumer base helps to reduce per unit costs by producing

⁵⁹ See Marc R. DeVore & Moritz Weiss (2014) "Who's in the cockpit? The political economy of collaborative aircraft decisions." *Review of International Political Economy*, 21:2, 497-533.

⁶⁰ Ethan B. Kapstein. "International Collaboration in Armaments Production: A Second-Best Solution." *Political Science Quarterly* 106, no. 4 (1991): 668.

⁶¹ Jonathan Caverley and Ethan B. Kapstein. "Arms Away: How Washington Squandered Its Monopoly on Weapons Sales." *Foreign Affairs* 91, no. 5 (2012): 125-32.

⁶² *Ibid*, 127.

more units, making it easier to achieve and maintain economies of scale.⁶³ Finally, collaboration on defense projects encourages alliance cohesion through increased interoperability of forces.⁶⁴ As a result, we should expect international arms cooperation to a practical alternative to the preferred method of autarkic arms production given decreased budgets and increased costs. This is summarized in the following hypothesis:

H₁: Decreases in defense spending across member states of a security alliance leads to an increase in IAC defense projects.

While alliances see decreases in their aggregate defense spending, reductions typically not uniform across every member state. This is especially true in asymmetric alliances, where few or even a single state continue to account for most of the group's military spending. As a result, within asymmetric alliances, the alliance "hegemon" or leader maintains significant clout in determining how arms are acquired, even in times of austerity. However, the preferences of alliance members, including the small states, remain the same – states want to preserve as much autonomy as possible. Given that completely indigenous arms production is unfeasible, small states in an asymmetric alliance will push for collaborative arms programs in order to benefit from economic offsets that provide access to advanced technology and stimulation of indigenous defense industries. The hegemonic leader of an alliance, still preferring to export its domestically

⁶³ Brooks 2005, 83.

⁶⁴ Ethan B. Kapstein. "International Collaboration in Armaments Production: A Second-Best Solution." *Political Science Quarterly* 106, no. 4 (1991): 668.

produced arms to its allies, will be more likely to turn to collaboration if its defense budget falls below its ability to support the increased costs of producing wholly indigenous advanced weapons systems. This leads me to my second hypothesis:

H2: International arms collaboration is a response to the high costs of technological inputs for advanced weapons systems.

Another factor that has increasingly affected the global arms market has been the diffusion of advanced technology. The 1970s and 1980s saw increased internationalization of the global arms industry, causing a widespread diffusion of dual-use technologies that helped to jumpstart defense production capacity in states that had previously been primary importers of foreign-made weapons systems.⁶⁵ Though defense industries had been slow to internationalize, civilian producers of advanced technological inputs in industries such as aerospace, microelectronics, computer software, and telecommunications, were now taking the lead in developing cutting-edge dual-use technologies. Because firms that produced these inputs were part of complex global supply chains, industrial expertise and capacity quickly diffused to more states, including many that had previously been significant importers of arms.⁶⁶ By the late 1980s the internationalization of dual-use technologies was the subject of several U.S. government studies that found there was significant reliance on foreign sources for many of the military's most advanced weapons systems, which alarmed holders of more traditional

⁶⁵ David Kinsella. 1999. "Arms Production in the Third Tier: An Analysis of Opportunity and Willingness." *International Interactions* 26 (3): 253-286.

⁶⁶ Brooks 2005, 84-85.

realist views.⁶⁷ What did this development mean for U.S. post-Cold War strategy? If the United States was facing both decreased defense budgets and increased foreign competition, then the risk of losing global arms market influence seemed plausible, even among allied states, who were now in a position to take a realist approach and increase defense industry autonomy. As a result, a U.S. alliance arming strategy based on off-the-shelf exports would no longer be feasible, as former arms importers now had a legitimate and indigenous alternative to American weaponry. U.S. allies could use this newfound military industrial capacity to leverage coproduction and codevelopment agreements with generous economic and technological offsets to further bolster their industries. This relationship between allies is summarized in the following two hypotheses:

H3: Small states in an asymmetric alliance prefer to collaborate on arms because of access to new technology and stimulation of domestic industrial base.

H4: Large states will agree to collaborate with small states if its defense budget is low and foreign competition is high.

⁶⁷ See Roderick Vawter. 1986. *U.S. Industrial Base Dependence/Vulnerability, Phase I: Survey of Literature*. Washington, D.C.: National Defense University. 4; Department of Defense (DoD). 1988. *Bolstering Defense Industrial Competitiveness: Preserving Our Heritage, Securing Our Future*. Washington, D.C.: Report to the Secretary of Defense by the Undersecretary of Defense (Acquisition), July. 155-157, 192.

6. Research Design

Because defense industry globalization is such a recent development in international relations, substantive data on the subject is extremely limited. As a result, I will be utilizing a mixed method approach to testing my hypotheses. Where available, I will make use of existing data on conventional arms transfers and international arms cooperation.⁶⁸ However, the majority of this paper will be a qualitative analysis of the largest collaborative arms program to date—the Joint Strike Fighter. This case is selected intentionally because of the project’s anomalous nature in international relations. In other words, the case is deviant from the majority of cases in the universe of U.S. arms production up until this point, which show that realist concern for autonomy has makes it irrational for an advanced industrial state to risk losing defense industrial capabilities through collaboration with allies, even if such collaboration may strengthen the alliance in the long run.⁶⁹

The time period covered by this research is from 1991 to 2015. I emphasize the post-Cold War era as this time period best captures the scope of the initial research puzzle. This is because (1) the radical changes in Western grand strategy resulting from

⁶⁸ There is a wealth of data available on annual arms transfers from one state to another. The U.S. Department of State maintains such publically available data via the World Military Expenditures and Arms Transfers (WMEAT) database. The Stockholm International Peace Research Institute (SIPRI) also keeps data on arms transfers and some licensed production measured in Trend Indicator Value (TIV). Meanwhile, substantive data on other means of IAC (coproduction and codevelopment) is virtually nonexistent. The most extensive dataset covering IAC is a database developed by Richard Bitzinger as part of the Defense Budget Project (DBP). The database contains information on hundreds of internationally produced, developed, and planned weapons systems, but covers cases only through 1995.

⁶⁹ Phillip Taylor. "Weapons Standardization in NATO: Collaborative Security or Economic Competition?" *International Organization* 36, no. 1 (1982): 97-98.

the collapse of the U.S.S.R, (2) the across-the-board cuts to global defense budgets following this event, and (3) the culmination of the technology revolution, which had begun to change the nature of arms production in the mid-twentieth century and now was a critical factor in future acquisitions.⁷⁰

The total universe of cases encompasses all U.S. to ally arms agreements involving the direct transfer, licensed production, coproduction, or codevelopment of combat aircraft-type weapons systems. The scope of this study will be limited to IAC agreements involving the United States because the U.S. represents the least likely case for significant IAC projects because the country's vast economic power and size puts it in the best position to remain self-sufficient in defense production.⁷¹ I will limit my analysis to only combat aircraft because (1) there is more data available for these types of weapons systems than others (small arms, for example) and (2) aircraft are platforms that feature more technologically advanced inputs and therefore inflict greater costs for purchasing states. Existing data on IAC tells us that there were thirty-three cases of codeveloped aircraft from 1991 to 1995, twelve cases of coproduced aircraft, and twenty-six cases of licensed production.⁷² Of course, this does not account for the many cases of IAC that were initiated after 1995. A major contribution of this study will be to expand

⁷⁰ See Eugene Gholz and Harvey M. Sapolsky. "Restructuring the U.S. Defense Industry." *International Security* 24, no. 3 (1999): 5-51; U.S. Congress, Office of Technology Assessment, *After the Cold War: Living with Lower Defense Spending, OTA-ITE-524* (Washington, DC: U.S. Government Printing Office, February 1992); and David Kinsella. 1999. "Arms Production in the Third Tier: An Analysis of Opportunity and Willingness." *International Interactions* 26 (3): 253-286.

⁷¹ Brooks 2005, 80.

⁷² Richard A. Bitzinger, DBP Globalization Database.

upon the globalized weaponry database created by Richard Bitzinger in the early 1990s for the Defense Budget Project.

The structure of this case study is exploratory and because the Joint Strike Fighter case is considered deviant, any subsequent proposed model of explanation may not necessarily be applied to other cases.⁷³ The purpose of this study is to develop a proposition based upon close examination of one particular case in an attempt to explain its existence better than do existing frameworks. The structure of this case study is theory-guided and interpretive.⁷⁴ Ultimately, while the evidence compiled and conclusions drawn as a result of this case study alone are insufficient to construct a challenging theory, it will highlight a significant gap in neorealist theories of international politics.⁷⁵

⁷³ Jason Seawright and John Gerring. 2008. "Case Selection Techniques in Case Study Research: A Menu of Qualitative and Quantitative Options." *Political Research Quarterly* (University of Utah) 61 (2): 302-303

⁷⁴ Jack S. Levy. 2008. "Case Studies: Types, Designs, and Logics of Inference." *Conflict Management and Peace Science* 25: 4.

⁷⁵ Levy cautions against basing new theories on case studies alone. Theory is "a logically interconnected set of propositions" and thus "requires a more deductive orientation than case studies provide."

7. Data and Analysis

Realist theory asserts that states always prefer autonomous defense production over reliance on foreign sources. In practice, however, very few states are able to develop sustainable indigenous defense industries. This has been especially true since the mid-twentieth century, which has been described as a period of rapid technological revolution.⁷⁶ This spread of advanced military technology has been accelerated by the rapid pace of globalization of the defense industry during the same time period.⁷⁷ The proliferation of engineering expertise and other intangible assets to “third tier” states has made it possible for more countries to achieve and maintain a minimum level of defense industrial capacity.⁷⁸ Evolution of indigenous arms production develops in third tier states in five steps:⁷⁹

1. Assembly of imported arms
2. Production of weapons components under license
3. Production of complete weapons systems under license
4. Modification, redesign, or reproduction of foreign weapons systems
5. Production of indigenously designed weapons systems

The ability of states to successfully produce weapons components or even entire weapons systems on their own is crucial in IAC, as it presupposes a minimum industrial base necessary for allied cooperation. While state industrial capacity is somewhat

⁷⁶ Keith Krause. "The Political Economy of the International Arms Transfer System: The Diffusion of Military Technique via Arms Transfers." *International Journal* 45, no. 3 (1990): 689.

⁷⁷ See Brooks 2005 and

⁷⁸ David Kinsella. 1999. "Arms Production in the Third Tier: An Analysis of Opportunity and Willingness." *International Interactions* 26 (3): 261.

⁷⁹ Andrew L. Ross. (1994). "Developing Countries." In Andrew J. Pierre (ed.), *Cascade of Arms: Managing Conventional Weapons Proliferation*, Washington, DC: Brookings Institution Press

difficult to quantify, Composite Indicator of National Capability (CINC) provides us with tangible measures. Table 6.1 lists seventeen U.S. allies and partner states by national material capability according to 1991 CINC scores.⁸⁰

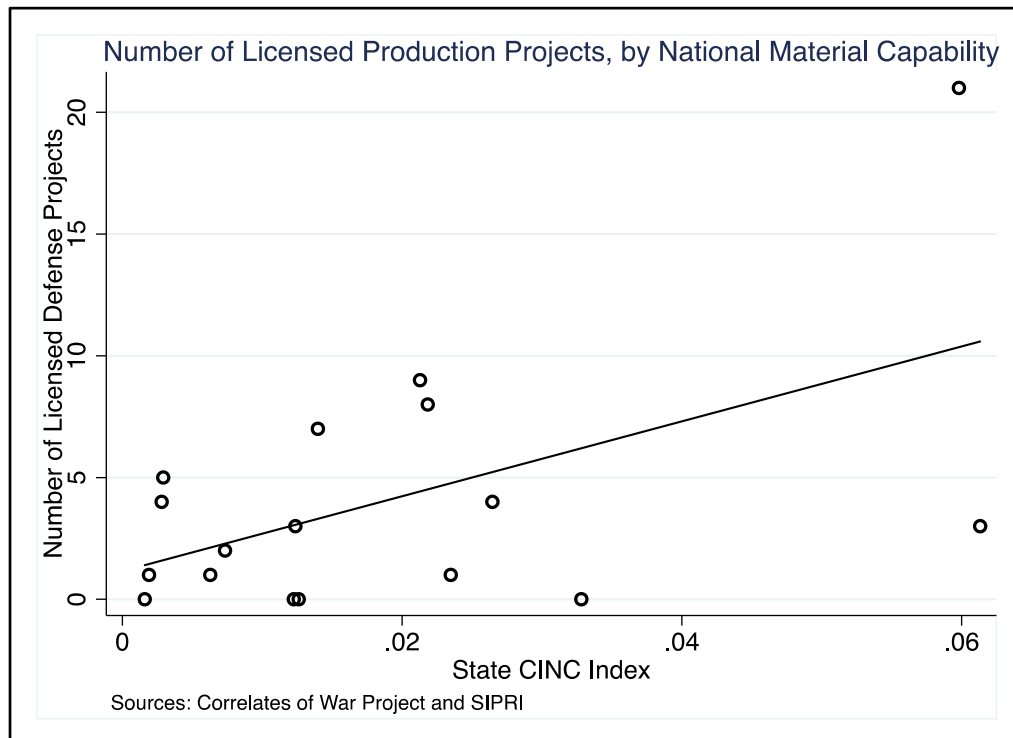
**Table 7.1 Selected U.S. Allies and Partners
by CINC 1991**

State	CINC
India	0.0613275
Japan	0.059807
Germany	0.0328156
United Kingdom	0.0264498
France	0.0234724
South Korea	0.0218287
Italy	0.0212774
Turkey	0.0139737
Saudi Arabia	0.0126078
Canada	0.0123652
Spain	0.0122554
Netherlands	0.0073363
Belgium	0.006281
Israel	0.0029186
Australia	0.0028072
Norway	0.0019046
Denmark	0.0015962

⁸⁰ J. David Singer, Stuart Bremer, and John Stuckey. (1972). "Capability Distribution, Uncertainty, and Major Power War, 1820-1965." in Bruce Russett (ed) *Peace, War, and Numbers*, Beverly Hills: Sage, 19-48; Singer, J. David. 1987. "Reconstructing the Correlates of War Dataset on Material Capabilities of States, 1816-1985" *International Interactions*, 14: 115-32.

CINC composite scores measure national capabilities based on factors such as population, military spending, and iron and steel production. If my hypothesis is correct, we should expect to see international arms cooperation between the U.S. and allies with higher CINC values, which indicate a greater capacity to contribute to the technologically intensive production of advanced weaponry. An initial bivariate regression of preceding CINC values and the total number of aircraft weapon systems produced under license from the United States between 1991 and 2015 yields a statistically significant relationship ($P > |t| = 0.027$) between national material capability and licensed production of weapons systems. This relationship is depicted by the scatterplot in Figure 8.1. However, it is important to note that more quantitative analysis is needed to explore this trend. My analysis in this paper is limited by the lack of existing data on the subject.

Figure 7.1



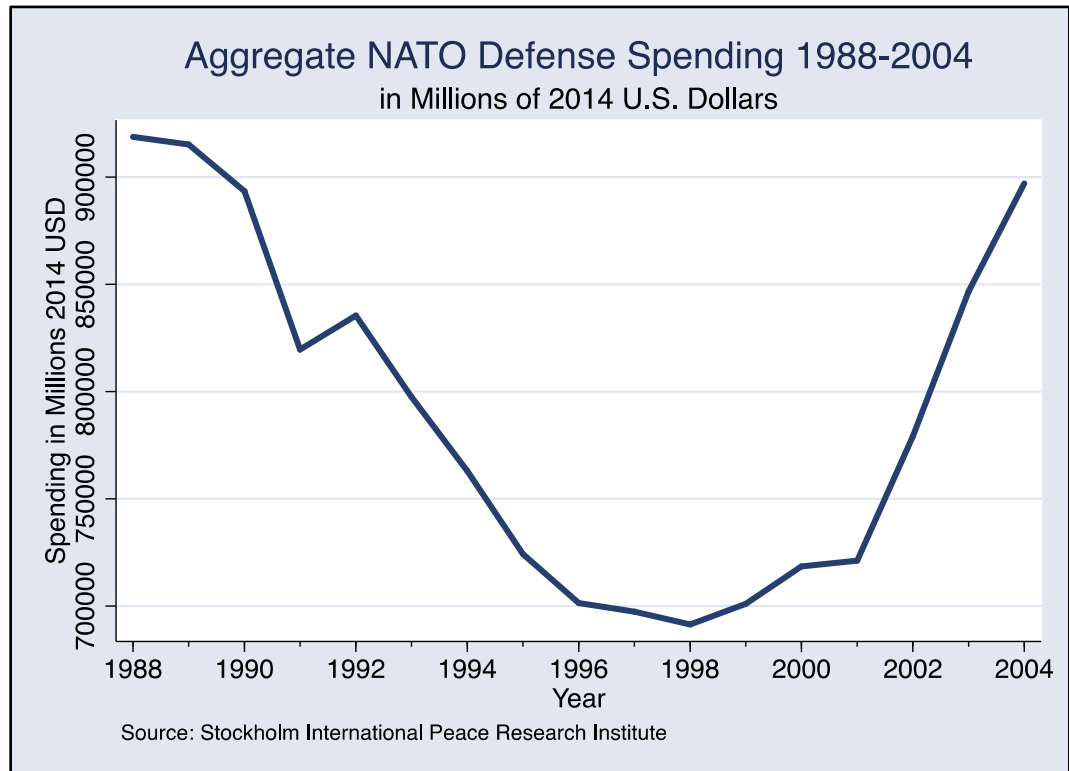
Falling Defense Budgets

While significant, the arms transfer numbers do not tell the entire story. For context, we must examine the overall trend of NATO spending as the Cold War drew to a close. Given the theoretical foundations laid out in the literature review section of this paper, we should expect the individual defense budgets of NATO members, and by extension NATO as a whole, to decrease in response to diminished threat from the Soviet Union. This assumption is supported by military spending data collected by the Stockholm International Peace Research Institute (SIPRI). Table 7.2 shows aggregate NATO spending between 1988 and 1997. As the data shows, NATO spending in the late 1980s is high at \$918.8 billion but then steadily declines into the 1990s, coinciding with the collapse of the USSR and reorganization of Eastern Europe, until it reaches a low point in 1998 at \$691.3 billion. This difference of over \$200 billion over a short period carried serious repercussions for the alliance's ability to acquire new weapons systems.

This stark decline in NATO military spending is further highlighted in Figure 7.2, which clearly shows rapid decline, especially from 1992 to 1996. Spending rises sharply again after 2001 and by 2004 approaches the levels of the late 1980s.

Table 7.2 Defense Spending by NATO Member State (2014 U.S. Millions)											
Country	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Belgium	8590	8457	8297	8180	6717	6378	6343	6214	6097	6020	6018
Canada	19352	19254	19236	17766	17569	17525	17271	16278	14948	13775	14251
Denmark	4830	4710	4714	4799	4711	4724	4605	4556	4571	4629	4680
France	69001	69847	69538	69991	67789	67038	67382	64047	62510	62725	61091
Germany	69498	69308	73042	67596	64288	57793	53898	53011	51977	50087	50248
Greece*	7159	6713	6787	6437	6689	6529	6641	6784	7190	7661	8349
Iceland	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Italy	37955	38254	36794	37313	36240	36434	35533	32452	35770	37506	38744
Luxembourg	188	172	179	198	206	188	207	202	209	225	242
Netherlands	13968	14100	13703	13321	13245	12172	11738	11404	11470	11350	11309
Norway	5325	5466	5511	5344	5791	5397	5674	5125	5195	5108	5446
Portugal	3571	3748	3853	3972	4078	3948	3841	4125	3977	4064	3974
Spain	19444	19340	19618	18854	18392	17921	18106	18250	17674	17501	18367
Turkey	9163	10602	12811	13169	13852	15315	14973	15382	17221	17942	18800
UK	64010	64574	64666	65413	61097	58306	56702	53183	52865	51200	51485
USA	586731	580705	554742	487221	514822	487764	460072	433220	409656	407537	398332
Total	918784	915249	893489	819571	835486	797431	762988	724233	701329	697332.1	691336.9
*SIPRI Estimated Values											
Source: SIPRI											

Figure 7.2



The sharp decline in defense spending on the part of NATO member states in the mid 1990s supports the idea that the United States and allies would have been either reluctant or unable to undertake large-scale military projects unilaterally. This, coupled with the rise in fixed costs for technologically advanced weapons systems, particularly for fifth-generation aircraft, would have given states increased incentive to collaborate in order to meet their respective security needs. However, quantitative data alone does not adequately demonstrate this connection, since the development of international arms collaboration is too recent to provide substantive data analysis on the subject.

Rising International Arms Collaboration

Altogether, the pressure on the U.S. government to adapt new defense policies to the changed geopolitical environment necessitated the exploration of new strategies of defense acquisition, especially when it came to alliances like NATO, which would continue to be influential despite the disappearance of its key adversary.⁸¹ Many of the proposed and attempted strategies have involved some form of international arms cooperation. While IAC had existed well before the end of the Cold War, it was usually the result of ad-hoc cooperation, whereas new IAC of the late 1980s and 1990s was done under more formalized bilateral and multilateral agreements.⁸² U.S. IAC during the Cold War consisted mostly of licensed production agreements with NATO allies as well as

⁸¹ See Celeste A. Wallander. 2000. "Institutional Assets and Adaptability: NATO After the Cold War." *International Organization* 54 (4): 705-735.

⁸² Richard A. Bitzinger. "The Globalization of the Arms Industry: The Next Proliferation Challenge." *International Security* (The MIT Press) 19, no. 2 (1994): 170-171.

Japan and South Korea, which allowed allies to indigenously manufacture American-designed weapons systems such as the F-104 fighter, M-60 tank, and Sidewinder air-to-air missile.⁸³

The more recent IAC strategies, corresponding with the end of the Cold War, have been coproduction and codevelopment, which further divides development and production responsibility to countries outside of the original “host.” In theory, these IAC strategies reduce overall costs to all involved states by collaborating on expensive research and development and achieving economies of scale through longer supply runs.⁸⁴ In the context of diminished threat level and rising upfront costs for the latest weapons systems, it seems reasonable to expect the number of U.S. IAC projects to continue to rise, especially given the growing influence of third-world defense production.⁸⁵

This hypothesis is indeed supported by data compiled by the Defense Budget Project, which shows a significant increase in the number of collaborative arms agreements between developed states and developing states as well as with each other. Specifically, the number of such agreements involving U.S. and NATO allies increased to unprecedented levels over latter half of the twentieth century. Between 1961 and 1980 there were 65 formal codevelopment or coproduction weapons programs involving

⁸³ Ibid, 176-177.

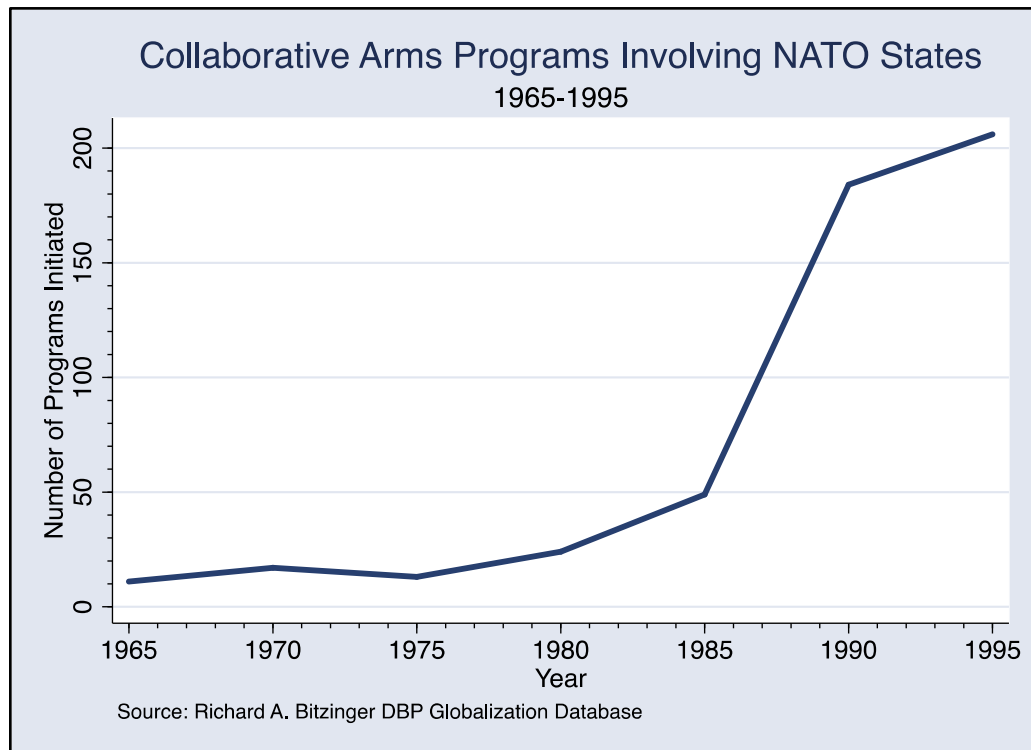
⁸⁴ Brooks 2005, 83.

⁸⁵ Richard A. Bitzinger. "The Globalization of the Arms Industry: The Next Proliferation Challenge." *International Security* (The MIT Press) 19, no. 2 (1994): 177.

NATO states. Between 1981 and 1995, the number of such arrangements grew to 439.⁸⁶

Figure 7.3 demonstrates this trend.

Figure 7.3



There does appear to be correlation between decline in NATO defense spending and increase in international arms collaboration. Furthermore, the same period of time saw significant proliferation of advanced technology with military applications, giving more states sufficient industrial capacity to develop their own defense industries. This would have created an increased incentive for these states to lobby for arms agreements

⁸⁶ Richard A. Bitzinger, DBP Globalization Database

that would have allowed access to technology held by established arms producers.

However, the limited data alone cannot provide a full assessment. In the case study, I will address the rationale of both large and small states in asymmetric alliances engaging in international arms collaboration.

8. Case Study: The F-35 Joint Strike Fighter

The F-35 is an ideal case for analysis because the project represents a clear departure from the long-established strategy of autonomous or near-autonomous arms production. While collaborative efforts on aircraft between allies had taken place before, no case approaches the Joint Strike Fighter's financial cost or number of participating states. It also contradicts the conventional wisdom that suggests that states prefer indigenous arms production. Indeed, U.S. arms production since World War II is best characterized as highly autonomous, utilizing domestic industrial capacity and government investment to produce cutting-edge arms for U.S. military forces and export to allies such as members of NATO.⁸⁷ However, with the end of the Cold War and reductions in military spending that came with it, the United States could no longer support such a massive defense industrial base. In addition, increased industry competition from Western European allies that had begun to grow in the 1970s as a result of state sponsored enterprises and heavy subsidization now presented a significant threat to U.S. control of the arms market.⁸⁸ Both of these factors – reduction in defense budgets and increase in foreign competition – contributed to the creation of the Joint Strike Fighter, and by extension, a fundamental change in U.S. arms acquisition strategy.

Since World War II, the U.S. has produced its weapons indigenously, utilizing its massive industrial base to produce cutting-edge weapons systems. In addition to

⁸⁷ Taylor, Phillip. "Weapons Standardization in NATO: Collaborative Security or Economic Competition?" *International Organization* 36, no. 1 (1982): 99.

⁸⁸ *Ibid.*, 99-100.

bolstering economic growth, this policy was ideal from a classical realist perspective. That is, states value an autonomous defense industrial base that is able to produce arms independent of exterior providers because it gives states a level of control over the production of arms and limits vulnerability to supply cutoffs in times of crisis.⁸⁹ As an added benefit, large states with significant defense industries are in a better position to remain in the cutting-edge of weapons technology due to the scale of financial inputs and a sizable domestic market.⁹⁰ Post-World War II, the United States became the dominant provider of arms to its allies, transferring the latest tanks, air defense systems, missiles, and aircraft to deter Soviet aggression.⁹¹ Once the Soviet threat disappeared, so did the need to mass produce advanced weapon systems for domestic and allied consumption. The United States was no longer willing to maintain near-wartime level military spending. Therefore, the development of the Joint Strike Fighter program supports my first hypothesis about the negative relationship between military spending and international collaboration. The F-35 constituted a pragmatic approach to arms production, emphasizing cost reductions at the expense of industrial autonomy.

Effect of Rising Technology Costs

⁸⁹ Ethan B. Kapstein. "International Collaboration in Armaments Production: A Second-Best Solution." *Political Science Quarterly* 106, no. 4 (1991):

⁹⁰ Brooks, 2005.

⁹¹ Phillip Taylor. "Weapons Standardization in NATO: Collaborative Security or Economic Competition?" *International Organization* 36, no. 1 (1982): 99.

While decreased budgets provide incentive to cut costs, austerity alone cannot adequately explain the case of the Joint Strike Fighter. There had been several instances of decreased defense budgets throughout the Cold War, some more severe than those of the 1990s, which did not result in extensive codevelopment programs. What other factors could be influencing U.S. arms production strategy? Unlike previous reductions in defense spending, the 1990s defense cuts coincided with a significant increase in advanced technological inputs for new weapons systems, particularly aircraft. As a result, fixed costs in the technology-intensive research and development phase of production now represented almost fifty percent of a total weapons systems costs, compared to only five percent in the 1950s.⁹² This increased financial burden for the production of advanced weapons systems, coupled with reduced military spending, increased pressure on the United States to find new ways to minimize costs to maintain its defense capabilities heading into an uncertain twenty-first century.

In Congress, the consensus was in favor of cutting programs meant to produce replacements for aging fleets of aircraft. From a realist perspective, this entailed jeopardizing U.S. military capabilities in the long-term, which could have serious ramifications for security, something that was of grave concern to senior members in the Armed Services Committee during the FY1994 budget debates.⁹³ In an effort to fund initial research for eventual replacement aircraft programs, the Clinton Administration and Congress agreed to merge the Common Affordable Lightweight Fighter (CALF) and

⁹² Ethan B. Kapstein. "International Collaboration in Armaments Production: A Second-Best Solution." *Political Science Quarterly* 106, no. 4 (1991): 668.

⁹³ "1993 SUMMARY OF MAJOR LEGISLATION DEFENSE and FOREIGN POLICY." *CQ Weekly* (December 11, 1993): 3399-406.

the Joint Advanced Strike Technology project (JAST) into a single program that became known as the Joint Strike Fighter (JSF).⁹⁴ The program's White Paper published by the Department of Defense in 1996 emphasized cost effectiveness as JSF's key feature:

The focus of the program is affordability—reducing the development cost, production cost, and cost of ownership of the JSF family of aircraft. The program is accomplishing this by facilitating the Services' development of fully validated, affordable operational requirements, and lowering risk by investing in and demonstrating key leveraging technologies and operational concepts prior to the start of Engineering and Manufacturing Development (E&MD) of the JSF.⁹⁵

At its core, the Joint Strike Fighter represented a means to develop next-generation aircraft systems while keeping costs low. While the program emphasized cooperation between the Air Force, Marine Corps, and Navy, it also emphasized an unprecedented level of internationalization early on in the initial design phase. The same document noted that the U.K.'s Royal Navy had invested \$200 million dollars in the program and that "Foreign participation is expected to increase."⁹⁶ This signaled the beginning of a fundamental shift in American arms procurement strategy. For the first time, a major weapons system program was formed on the assumption of international collaboration in the earliest stages of development with the explicit expectation that more foreign governments would have the opportunity to join. While international collaboration between the United States and allies, particularly in Western Europe, had been emphasized as a foundational goal of the alliance, efforts to codevelop advanced weapons systems such as aircraft only resulted in agreements that divided economic

⁹⁴ Srdjan Vucetic and Kim Richard Nossal. "The International Politics of the F-35 Joint Strike Fighter." *International Journal* 68, no. 1 (2012): 4.

⁹⁵ U.S. Department of Defense. 1994. "Charter for the Joint Advanced Strike Technology (JAST) Program." Office of the Deputy Secretary of Defense.

⁹⁶ *Ibid.*

offsets across participants in the form of licensed production rather than sustained partnerships.⁹⁷ However, rising pressure to cut military spending across the Western allies and high fixed costs put the Joint Strike Fighter in a position to succeed as both a cost-saving measure and improvement of alliance cohesion.

Technology Diffusion and Increased Competition

The 1970s and 1980s saw increased internationalization of the global arms industry, causing a widespread diffusion of dual-use technologies that helped to jumpstart defense production capacity in states that had previously been primary importers of foreign-made weapons systems.⁹⁸ Though defense industries had been slow to internationalize, civilian producers of advanced technological inputs in industries such as aerospace, microelectronics, computer software, and telecommunications, were now taking the lead in developing cutting-edge dual-use technologies. Because firms that produced these inputs were part of complex global supply chains, industrial expertise and capacity quickly diffused to more states, including many that had previously been significant importers of arms.⁹⁹ By the late 1980s the internationalization of dual-use technologies was the subject of several U.S. government studies that found there was significant reliance on foreign sources for many of the military's most advanced weapons

⁹⁷ See Brooks, 2005; Ethan B. Kapstein. "International Collaboration in Armaments Production: A Second-Best Solution." *Political Science Quarterly* 106, no. 4 (1991)

⁹⁸ David Kinsella. 1999. "Arms Production in the Third Tier: An Analysis of Opportunity and Willingness." *International Interactions* 26 (3): 253-286.

⁹⁹ Brooks 2005, 84-85.

systems, which alarmed holders of more traditional realist views.¹⁰⁰ What did this development mean for U.S. post-Cold War strategy? If the United States was facing both decreased defense budgets and increased foreign competition, then there was a significant risk of losing global arms market influence, even among allied states, who were now in a position to take a realist approach and increase defense industry autonomy. As a result, a U.S. alliance arming strategy based on off-the-shelf exports would no longer be feasible, as former arms importers now had a legitimate and indigenous alternative to American weaponry.

The Department of Defense's International Security Handbook acknowledges falling military spending as well as high technology costs as contributing to the trend of arms internationalization, "Reductions in the defense budgets of the United States and NATO nations, and in other allied and friendly nations, coupled with the high cost of weapons systems has resulted in more international cooperation on the development of weapons systems. This trend is expected to continue."¹⁰¹ Given this assessment, the Joint Strike Fighter became an international endeavor, with eight partner states contributing to the system development and demonstration phase of the project.¹⁰²

¹⁰⁰ See Roderick Vawter. 1986. *U.S. Industrial Base Dependence/Vulnerability, Phase 1: Survey of Literature*. Washington, D.C.: National Defense University. 4; Department of Defense (DoD). 1988. *Bolstering Defense Industrial Competitiveness: Preserving Our Heritage, Securing Our Future*. Washington, D.C.: Report to the Secretary of Defense by the Undersecretary of Defense (Acquisition), July. 155-157, 192.

¹⁰¹ Defense Security Cooperation Agency (DSCA). 2009. "Chapter 2: Types of International Programs." In *International Programs Security Handbook*, 20. Office of the Deputy Under Secretary of Defense for Policy Support.

¹⁰² Srdjan Vucetic and Kim Richard Nossal. "The International Politics of the F-35 Joint Strike Fighter." *International Journal* 68, no. 1 (2012): 6.

Partner State Preferences and the Joint Strike Fighter

The Joint Strike Fighter program's eight "partner" states earned this designation through their financial investment in the early stages of development. Most of these states were European and members of NATO, including the United Kingdom, Italy, Norway, and the Netherlands. To reiterate my hypothesis, small states will choose international arms collaboration if they can access foreign technology and stimulate their domestic industries. As established by realist literature, these states prefer to produce their own arms rather than depend on a foreign state, even if the foreign state is an ally, such as the United States. Given this premise, the fact that NATO states imported most of their armaments from the United States during the early decades of the Cold War speaks to the inability of these states to support and maintain the domestic industrial capacity necessary to produce their own cutting-edge weapons systems. This calculus began to change as technological expertise began to diffuse across the global arms industry in the 1970s and 1980s.¹⁰³ By the 1990s, Western European NATO states were combining their resources to develop and produce their own jet fighters, such as the Gripen, Rafale, and Eurofighter.¹⁰⁴ As a result, these states were now able to feasibly pursue their preferred method of arms acquisition.

While realist theory tells us that states will always prefer indigenously produced arms over imports, European states Italy, Norway, and the United Kingdom still elected

¹⁰³ See David Kinsella. 1999. "Arms Production in the Third Tier: An Analysis of Opportunity and Willingness." *International Interactions* 26 (3): 253-286.

¹⁰⁴ Ethan B. Kapstein. "Capturing Fortress Europe: International Collaboration and the Joint Strike Fighter," *Survival* 46:3 (Autumn 2004): 138.

to participate the American Joint Strike Fighter, even though indigenous European alternatives were available. This departure from expected policy signifies an additional underlying factor contributing to these states' decision-making. In other words, these states see value in participating in the Joint Strike Fighter that outweighs the benefits of acquiring domestic fighter aircraft. While what exactly constitutes this value is unclear, there are a few potential motivations driving this seemingly anomalous policy. First, states view U.S. weapons as continuing to set the standard for cutting-edge weaponry. Even though European states can produce suitable alternatives, they ultimately may not adequately or cost-effectively perform the various roles assigned to them as their American counterparts. For example, the Italian military chose the F-35 to replace several of its aging carrier-based aircraft because it was designed as a multi-role aircraft, serving the roles of surveillance, close air support, and suppression of enemy air defenses, while the Eurofighter was designed mainly as an air defense aircraft.¹⁰⁵ Norway's Ministry of Defence cited the F-35's high-tech stealth features as the deciding factor in their fighter competition.¹⁰⁶

Second, states see strategic benefits in obtaining arms from the United States. It has long been a goal of NATO to standardize weapons systems across alliance members in order to ensure interoperability and effectiveness as a counter to the Warsaw Pact.¹⁰⁷

¹⁰⁵ Alessandro Marrone. "Italy and the F-35: Rationales and Costs." *International Journal* 68, no. 1 (2012): 35.

¹⁰⁶ Jens Ringsmose. "Investing in Fighters and Alliances: Norway, Denmark, and the Bumpy Road to the Joint Strike Fighter." *International Journal* 68, no. 1 (2012): 102.

¹⁰⁷ Phillip Taylor. "Weapons Standardization in NATO: Collaborative Security or Economic Competition?" *International Organization* 36, no. 1 (1982): 95-112.

However, attempts to do so were always undermined by state preferences rooted in realist theory. Yet Norway saw strategic advantages in choosing the F-35 over a European, and likely cheaper, alternative. A report published by the Norwegian Defence Ministry highlighted the key strategic factors to be emphasized in the fighter decision-making process, including alliance cohesion and increased cooperation with “large allies” fielding the same weapons systems.¹⁰⁸ The report concluded that “it is important for Norway to position itself within the Alliance via close collaboration with selected close allies, in order for [Norway’s] assessments and priorities to be noted. In a more heterogeneous NATO a good bilateral relationship to the United States is at least as important as before.”¹⁰⁹ Strategic considerations also played a role in Italy’s decision to join the Joint Strike Fighter program. While Italy values its domestic industrial base, it is also aware of its volatile geographic position between unstable regions in North Africa and the Balkans. Historically, this reality has prompted Italy to establish alliances with stronger powers. Yet this is also rooted in realist theory in the form of balance of power theory.¹¹⁰ With respect to the Joint Strike Fighter, Italy views its participation in the program as essential for strengthening its relationship with the United States during an uncertain security environment that has persisted since the fall of the Soviet Union.¹¹¹

¹⁰⁸ Jens Ringsmose. "Investing in Fighters and Alliances: Norway, Denmark, and the Bumpy Road to the Joint Strike Fighter." *International Journal* 68, no. 1 (2012): 104.

¹⁰⁹ Ibid.

¹¹⁰ See Stephen M. Walt. "Alliances: Balancing and Bandwagoning." In *International Politics: Enduring Concepts and Contemporary Issues*, by Robert J. Art and Robert Jervis, 110-117. New York: Pearson/Longman, 2005.

¹¹¹ Marrone, Alessandro. "Italy and the F-35: Rationales and Costs." *International Journal* 68, no. 1 (2012): 40.

Finally, the most frequently cited rationale for Joint Strike Fighter participation is economic. As democracies, NATO states need to consider the implications of defense policy for their citizens and voters. The constriction of defense budgets, as established in the data analysis section, had a devastating effect on the domestic industries of all NATO allies, but especially those in Western Europe.¹¹² As a result, states needed to focus their attention on preserving domestic employment through defense-related industries.¹¹³ This fact, coupled with rising European capability due to technology diffusion, caused states to turn away from their traditional arms acquisition methods, namely, importing weapons systems from the United States. Had this trend continued, it could have eventually diminished U.S. influence over the European arms market, an outcome unacceptable to American defense policymakers.

Leading State Preferences

As stated earlier in this paper, the United States, and leaders of asymmetric alliances in general, have a preference for producing arms indigenously and exporting these weapons systems to dependent allied states.¹¹⁴ Yet, the circumstances that propelled the creation of the Joint Strike Fighter program were not conducive towards this conventional realist approach. To reiterate my final hypothesis, while large states in such

¹¹² See Richard A. Bitzinger. "The Globalization of the Arms Industry: The Next Proliferation Challenge." *International Security* (The MIT Press) 19, no. 2 (1994): 170-198.

¹¹³ Ethan B. Kapstein. 2010. "Arsenal's End? American Power and the Global Defense Industry." Center for a New American Security. 8.

¹¹⁴ Phillip Taylor. "Weapons Standardization in NATO: Collaborative Security or Economic Competition?" *International Organization* 36, no. 1 (1982): 99.

alliances always prefer to export arms “off-the-shelf,” they will participate in international collaboration if domestic military spending is low and competition from foreign states is high. This policy reflects a “second-best” solution as the United States is forced to acquiesce to the demands of its less powerful allies in collaborative agreements.¹¹⁵

One of the main reasons the United States is hesitant to engage in coproduction or codevelopment agreements with allies is the issue of technology transfer and diffusion. The United States has always been protective of its intellectual property, especially when concerning design and production of state-of-the-art weapons systems. This concern was highlighted in the 1980s when Israel secretly re-exported American technology to China. This technology had been transferred to Israel as part of the U.S.-Israeli Lavi fighter program.¹¹⁶ Such risks of transfer of sensitive U.S. technology to third parties via allied states led U.S. policymakers to take strict measures against international collaboration, such as enacting the Obey Amendment, which banned the foreign sale of the F-22 Raptor to any foreign government as of 1998, and is still in effect today.¹¹⁷

What implications did such a strict policy have on the Joint Strike Fighter, a program that emphasized the joint development of advanced stealth technology for a fifth-generation fighter jet? Many experts within the United States were very dubious about the prospect of sharing too much expertise with so many foreign governments. A

¹¹⁵ See Ethan Barnaby Kapstein. "International Collaboration in Armaments Production: A Second-Best Solution." *Political Science Quarterly* 106, no. 4 (1991): 657-75.

¹¹⁶ David Isenberg. 2002. "Israel's Role in China's New Warplane ." *Asia Times*. Hong Kong, December.

¹¹⁷ U.S. House Amendment 295 to H.R. 2266: *Department of Defense Appropriations Act, 1998* Congress.gov

1994 report published by the Defense Science Board warned policymakers that coproduction and codevelopment agreements for the Joint Strike Fighter should be avoided due to the risk of losing technological advantages and that the United States should instead design an “export-only” variant of the new jet that would minimize such risks.¹¹⁸ Despite this warning, the JSF program continued to involve foreign states, offering incentives of technology transfer and economic offsets to convince governments to commit to the F-35.

To understand why the United States chose to pursue the JSF program while understanding the potential negative consequences of technology transfer, I return to my hypothesis. First, defense spending was falling throughout the 1990s and plans to upgrade aging fleets of tactical aircraft came under constant threat of cancellation from Congress.¹¹⁹ Second, the natural diffusion of technology that had occurred in the previous decade through the globalization of dual-use industries allowed European countries to build up and sustain their own production of military hardware. Because the threat of losing market share in Europe to a purely European arms production, U.S. policymakers realized that they could no longer afford to take a pure realist stance on arms production and transfers. Losing the European market to European defense industry would have had a devastating effect on the United States’ arms industry, which was already struggling to adjust to lowering domestic demand.

¹¹⁸ Defense Science Board, *Task Force on Joint Advanced Strike Technology Program* (Washington DC: Department of Defense, September 1994), p. ES-7.

¹¹⁹ 143 Cong. Rec. S3852 - SENATE RESOLUTION 80--REGARDING TACTICAL FIGHTER AIRCRAFT PROGRAMS
Congressional Record. Regarding S. Res. 80. Mr. FEINGOLD. April 30, 1997

Ultimately, the Joint Strike Fighter program is an attempt by the United States to maintain its market share with its allies. Since the United States is no longer able to pursue its preferred policy of exporting American arms to allies, U.S. policymakers instead created a weapons program that they were willing to share to other states in order to prevent them from turning to their growing indigenous capabilities. This remains in line with realist theory, which argues that international collaboration is indeed a “second-best” solution.¹²⁰ The two key offsets offered to participating partner states come in the form of technology transfer and coproduction agreements. The number of units that each partner state is allowed to produce under the agreement is commensurate with each state’s financial investment and purchasing commitment. For example, the United Kingdom, a Level I partner, has contributed over 6% of the financial costs of the program and will ultimately indigenously produce 150 units, or just under 5% of all F-35 units.¹²¹

With respect to technology transfers, several partner states have expressed disappointment and have even threatened to withdraw from the program completely. Lockheed Martin, the F-35’s largest contractor, had been charged with the task of distributing workload across the partner states, a task Lockheed was both unprepared and unwilling to do.¹²² In addition, the United States has refused to share certain technologies such as software code with the United Kingdom, adding mistrust and animosity to what

¹²⁰ See Ethan Barnaby Kapstein. "International Collaboration in Armaments Production: A Second-Best Solution." *Political Science Quarterly* 106, no. 4 (1991): 657-75.

¹²¹ United States General Accounting Office. 2003. "JOINT STRIKE FIGHTER ACQUISITION: Managing Competing Pressures Is Critical to Achieving Program Goals." Congressional Testimony. 5.

¹²² Peter D. Antill and Pete Ito. "The UK and the Joint Strike Fighter: The Trials and Tribulations of International Collaborative Procurement." *International Journal* 68, no. 1 (2012): 18-19.

was to be an alliance-promoting collaboration.¹²³ Other countries dissatisfied with their shares of work include Canada, Italy, and Turkey, who have each threatened to exit the program.¹²⁴

The unequal distribution of work and limited sharing of technology has prompted critics to accuse the United States of utilizing a “Trojan horse” strategy to maintain its control over the European arms market.¹²⁵ In other words, the United States, unable to sell its arms to states with now viable alternatives, provides economic and technological incentives to participate in an American-led “international” weapons program, only to find themselves both at the mercy of the F-35’s consistent cost overruns and the United States’ strict limits on technology transfer. While this strategy may maintain the United States’ presence in the markets of its European allies, it remains uncertain whether future collaborative endeavors will have any support.

¹²³ Ibid, 19.

¹²⁴ Ibid.

¹²⁵ Ethan B. Kapstein. “Capturing Fortress Europe: International Collaboration and the Joint Strike Fighter,” *Survival* 46:3 (Autumn 2004): 138.

9. Conclusions and Policy Implications

While the F-35 Joint Strike Fighter is often considered an anomalous arms program given traditional realist preferences, the analysis in this paper lends support to the idea that the program does indeed fit within established norms of realist theory. Both large states (U.S.) and small states (NATO allies) elected to participate in the Joint Strike Fighter program as a means to preserve and bolster their respective industrial capacities. The United States did so to prevent itself from being locked out of an increasingly competitive European market while U.S. allies were looking to gain American technological expertise, stimulate their domestic industries through coproduction, and eventually utilize their newfound knowledge to further increase the competitiveness of their arms production capacities to eventually outpace the United States.

Thus far, the United States appears to be gaining more from this strategy. By committing eight states to procure a fifth-generation American fighter, the United States ensures that the European market will remain firmly within U.S. control for the foreseeable future. This objective is aided further by stringent controls over advanced technologies.

Because this research is exploratory in nature, it would be inappropriate to draw general conclusions about the future of international arms collaboration. Future quantitative analysis may compare the Joint Strike Fighter to other collaborative arms programs if the number of such programs continues to significantly grow. While this analysis supports a new form of realist application in arms acquisition, more research is needed on the

subject of collaborative arms, which is still a relatively novel practice in international relations. As a result, the question as to whether or not the Joint Strike Fighter marks the end of arms autonomy cannot yet be answered. For now, the United States must be more mindful of the demands and expectations of its partners. While protection of sensitive international property reflects sound realist policy in the short-term, it may reduce prospects for future collaborative arms projects with allies, especially as globalization continues to alter the global conventional arms industry.

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