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# Restructuring the U.S. Defense Industry

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**T**he end of the Cold War produced major changes in the U.S. defense sector. More than 2 million defense workers, military personnel, and civil servants have lost their jobs. Thousands of firms have left the industry. More than one hundred military bases have closed, and the production of weapons is down considerably.

As significant as these changes are, they do not address the key issues in restructuring the post-Cold War defense sector. The Reagan-era defense buildup led contractors to invest in huge production capacity that no longer is needed. This capacity overhang includes too many open factories, each of which produces a “legacy” system that was designed for the Cold War. Many individual defense plants are also too large to produce efficiently at post-Cold War levels of demand. Until this excess capacity is eliminated, the United States will continue to spend too much on defense.

The politics of jobs and congressional districts that many analysts thought governed the Cold War have triumphed in its aftermath. Today, years after the collapse of the Soviet Union, not one Cold War weapon platform line has closed in the United States.<sup>1</sup> The same factories still produce the same aircraft, ships, and armored vehicles (or their incremental descendants).

During the Cold War, the high level of perceived security threat increased U.S. policymakers’ respect for military advice on weapons procurement and research and development (R&D) decisions. The military services’ expert knowledge checked Congress’s pork barrel instincts, and failed or unneeded weapon systems were often canceled. Today, however, contractors and congress-

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1. A line is a privately held or managed facility that builds a particular weapon platform. Some major defense industry facilities do not meet this definition: for example, plants that produce major subassemblies (e.g., wings, turrets, and radars) and plants that produce complete munitions (e.g., bombs and bullets). The political economy of business-government relations for these plants differs from the relationships that affect the weapon system production lines, as is explained below. The primary focus of this article is on the weapon system production lines.

sional representatives have cemented the military-industrial ties that critics feared during the Cold War; the military's power to resist is limited, and in many cases so is its commitment even to try.

The drawdown after the Cold War is often portrayed as one of the harshest when compared to the defense cuts after other wars fought by the United States.<sup>2</sup> It has actually been the gentlest: more than a decade after the defense budget cuts started, government contracts still support 2.1 million private defense-sector employees—400,000 more than at the budgetary low point of the Cold War.<sup>3</sup>

Adjusting the size, shape, and goals of the U.S. defense procurement effort to post-Cold War needs has proven a difficult political challenge. The solution requires a new policy strategy from the military services, the civilian Office of the Secretary of Defense, and the Congress. This new strategy must recognize the post-Cold War political realities in the defense industrial base that currently drive defense procurement. The United States' bloated, pork barrel defense acquisition budget can be cut—if policymakers buy out the defense industry's overcapacity.

This article proceeds in five substantive sections. The first section describes the current state of the defense industrial base—specifically, the magnitude of the overcapacity problem. The second section develops a theory of the politics of defense contracting that accounts for the United States' shift from its generally savvy decisionmaking during the Cold War to the current dominance of pork barrel politics. The key independent variable is the level of security threat perceived by the United States. The third section offers qualitative evidence in support of the threat-based theory of defense sector business-government relations from a series of cases in the aircraft, shipbuilding, and armored vehicle industries. The fourth section introduces quantitative evidence to support the theory. We use stock market data to compare the riskiness of investment in the defense industry during the Cold War to the riskiness of the post-Cold War era. The fifth section provides a three-step policy recommendation to break the new politically induced follow-on imperative that is keeping the old production lines open.

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2. For example, see quotations from congressional representatives in Eric Pianin, "Turnabout on Defense Funds," *Washington Post*, May 29, 1999, p. 1. See also "From Pentagon to Triangle," *Wall Street Journal*, May 17, 1999, p. A26.

3. Compare Cold War figures from Harlan K. Ullman, *In Irons: U.S. Military Might in the New Century* (Washington, D.C.: National Defense University Press, 1995), pp. 169–170, to post-Cold War figures from Paul Kaminski, letter, *Issues in Science and Technology*, Vol. 13, No. 3 (Spring 1997), p. 13; and "QDR: Shaping the Force of the Future," *Defense*, No. 4 (1997), p. 21.

### *The Burden of Surplus Production Capacity*

The magnitude of the U.S. Cold War defense production effort drastically expanded contractors' capacity. The longevity of the effort also fundamentally changed the industrial organization of the defense industry and the interest-group landscape for defense policymaking. This section describes the status of the defense industrial base since the fall of the Berlin Wall in 1989.

Before the Cold War, the United States demobilized at the end of its wars. Civilian contractors, brought in to help produce desperately needed military equipment, usually returned to commercial production as defense dollars dried up.<sup>4</sup> Government-owned arsenals and shipyards nurtured military-unique technologies to the extent that anyone did between wars. Defense spending followed a pattern of sharp increases for wars followed by steep declines; long periods of minuscule defense budgets characterized the interwar years. That pattern applied to both the Civil War and World War I, and World War II seemed likely to follow a similar course—until the Cold War started.

The Cold War was different from previous wars. It brought a sustained flood of defense dollars, and private contractors responded by moving into the defense sector. According to one observer, public and private interests in the United States' acquisition of weapons blended in a "Contract State."<sup>5</sup> The U.S. government provided the funding to drive the pace of technological change normally left to firms and entrepreneurs in a free-enterprise economy. As a result, the government became dependent on private contractors for most necessary military-technical skills.

During the Cold War, the growth of the private defense industry followed a ratchet pattern: in booms, private production capacity expanded; in defense procurement troughs, the private manufacturers cut less capacity than they had built up.<sup>6</sup> Even at the Cold War low points, outlays for R&D and defense procurement were sufficient to keep the defense industry focused on military rather than commercial markets (see Figure 1).<sup>7</sup> During the cyclical downturns,

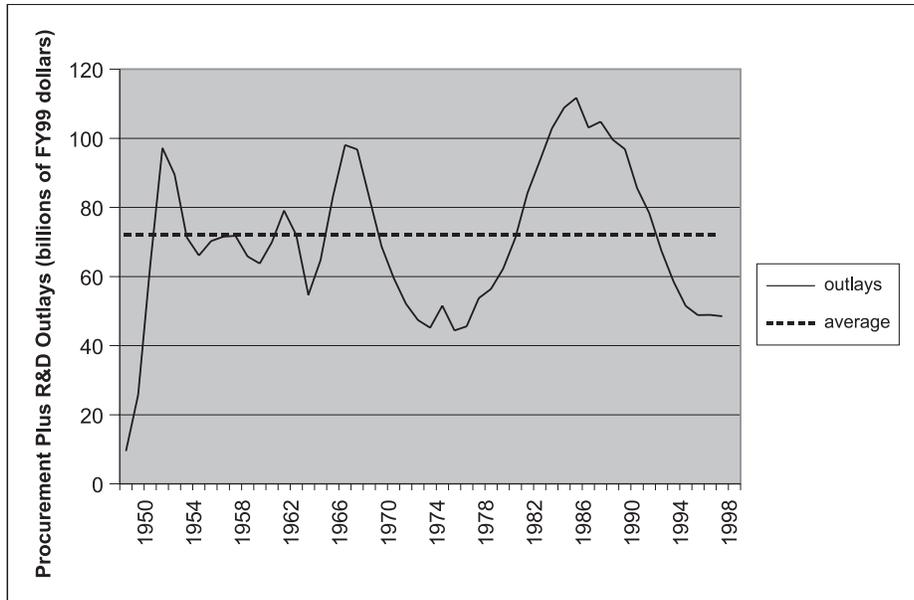
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4. Merritt Roe Smith, "Military Arsenals and Industry before World War I," in Benjamin Franklin Cooling, ed., *War Business and American Society: Historical Perspectives on the Military-Industrial Complex* (Port Washington, N.Y.: Kennikort Press, 1977), pp. 36–37.

5. Don K. Price, *Government and Science* (New York: New York University Press, 1954); and Price, *The Scientific Estate* (Cambridge, Mass.: Harvard University Press, 1965).

6. For a related argument, see Bartholomew Sparrow, *From the Outside In: World War II and the American State* (Princeton, N.J.: Princeton University Press, 1996).

7. By far the largest share of R&D outlays are spent on the development of major platforms such as the F-22, V-22, and Comanche. That spending is directly connected to the production lines that are usually counted as dependent on the procurement budget. As a result, the best measure of the

**Figure 1. Defense Budget Outlays to the Defense Industry.**

SOURCE: *2000 Budget of the United States* (Washington, D.C.: GPO, 1999).

the government closed the arsenals, shifting more business to private sector contractors, who were more politically influential than the managers and employees of the public facilities.<sup>8</sup> Many government production facilities were phased out after the Korean War; Defense Secretary Robert McNamara shuttered many more in the early 1960s.<sup>9</sup> In the aftermath of the Vietnam War, the government relegated its shipyards to repair work and outsourced most am-

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financial relationship between the military and the defense industry aggregates the procurement and R&D budgets.

8. William B. Burnett and Frederic M. Scherer, "The Weapons Industry," Walter Adams, ed., *The Structure of American Industry* (New York: Macmillan, 1990). A variety of rationales have been offered for the shift. Private industry was said to be more responsive to the services' needs than were the government arsenals; industrial workforces were believed to be more flexible than public workforces; contractors paid higher salaries than the civil service did to attract the top scientists and engineers to defense work. Arsenals were commanded by military officers, who faced outright legal restrictions on their ability to lobby Congress, whereas contractors had no compunctions about resisting cutbacks. Whether the true explanation is one of these or some other, it is clear that a number of government facilities were closed before the recent rounds of Base Realignment and Closure Commissions.

9. The Army and Navy tried to maintain an arsenal system in the 1950s for weapons design; production would have been contracted out. That system is described in congressional testimony

munition manufacturing, leaving almost no government production at all.<sup>10</sup> The fate of just a few large laboratories, five or six depots, and a handful of public shipyards—the rump of the government’s arsenal system—is all that is at stake in the current debate about whether to close government facilities.<sup>11</sup>

At the plant level, the current overcapacity in the defense industrial base stems from the heyday of the Reagan buildup.<sup>12</sup> The number of defense contractor employees doubled between 1976 and 1986, rising to more than 3.3 million from about 1.7 million, while the number of military personnel and civil service employees in defense agencies hardly changed.<sup>13</sup> The Reagan buildup was intended to recapitalize U.S. forces, providing them with the most modern weapon systems in preparation for a major European war. That war was never fought, and U.S. weapon inventories are currently bulging.

The case of tank procurement is typical of the existing capacity overhang: the United States already has more top-quality tanks than it deploys, yet defense contractors still maintain huge facilities that could produce many additional tanks. The United States equipped 18 active and 6 reserve Army divisions as recently as 1991 with 8,000 main battle tanks, including 4,000 M1A1 type or better. Today the active Army has 6 heavy divisions, each with

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by Brig. Gen. Jean E. Engler, Director of Procurement, Office of the Assistant Deputy Chief of Staff for Logistics, Department of the Army, Subcommittee for Special Investigations, Committee on Armed Services, 85th Cong., 2d sess., *Utilization of Government-Owned Plants and Facilities*, December 2–3, 1958. The Air Force’s model of contracting design, too, later swept through the other services’ industrial bases. For debate on the McNamara closures and data on the late 1950s’ closures, see *Deactivation of Military Installations*, Hearings before a Special Subcommittee of the Senate Committee on Commerce, 87th Congress, 1st Session, September 15, 1961. See also Edward C. Ezell, “The Death of the Arsenal System? The Decision to Close Springfield Armory,” paper presented to the annual meeting of the Organization of American Historians, Dallas, Texas, April 18, 1965.

10. For shipbuilding, see Michael C. Potter, *Electronic Greyhounds: The Spruance-Class Destroyers* (Annapolis, Md.: Naval Institute Press, 1995); “Two Admirals Quit Posts in Protest over McNamara,” *New York Times*, October 28, 1965, p. 1; and Jack Raymond, “Admiral Explains Why He Resigned,” *New York Times*, October 29, 1965, p. 32. For the ammunition industrial base, see Harry F. Ennis, *Peacetime Industrial Preparedness for Wartime Ammunition Production*, National Security Affairs Monograph Series No. 80–7 (Washington, D.C.: National Defense University, September 1980), pp. 54–60.

11. “Perry Supports End to 60–40 Split for Depot Work,” *Defense Daily*, April 28, 1995, p. 137; Deborah Clay-Mendez, *Public and Private Roles in Maintaining Military Equipment at the Depot Level* (Washington, D.C.: Congressional Budget Office, July 1995); and Loren B. Thompson, “Private-Public Competition—Bad Proposition That Refuses to Die,” *National Defense* (October 1997), pp. 22–23.

12. In many cases, the production contracts were carried out in facilities originally built for previous generations of defense production, but the product-specific tooling now in question dates from the Reagan era.

13. Ullman, *In Irons*, pp. 169–170.

approximately 300 tanks.<sup>14</sup> The Army National Guard currently is allotted 1,260 M1A1s and 1,684 older-model M1s.<sup>15</sup> The Marines have another division's worth of M1A1s (more than 300), for a total U.S. military requirement of about 2,100 active component tanks (M1A1 or better) and fewer than 3,400 total first-line tanks. Without building any new ones, the United States has many high-quality tanks left over for wartime attrition, for upgrades for the National Guard and reserves, and for various prepositioning options—especially as older M1s are converted to the M1A1 or better configurations.<sup>16</sup>

Nevertheless, General Dynamics Land Systems' (GDLS) Lima, Ohio, tank plant has the capacity to manufacture up to 60 new M1 tanks per month. No new tanks are currently being produced, but GDLS is upgrading older M1s at a low rate for both the U.S. Army and export customers.<sup>17</sup> The upgrade to the M1A2, which accounts for about one-third of the U.S. buy and most of the exports, involves almost complete reconstruction of the tank from the chassis up—much like building a new tank. Yet the M1 upgrade contracts and a small contract for Wolverine armored bridging vehicles based on the M1 chassis

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14. The other four active U.S. Army divisions, designed for rapid deployment, are not equipped with M1s or other heavy tanks. The stocks of weapon platforms freed up by the force structure cutbacks, including those of tanks, are currently used to maintain high combat-equipment readiness in the Army. Ron Laurenzo, "Army Is Ready, GAO Says," *Defense Week*, June 21, 1999, p. 1.

15. Combat forces in the Army National Guard currently include 14 heavy enhanced Separate Brigades and one Armored Cavalry Regiment, although 6 of the National Guard's combat brigades are being converted to combat support or combat service support roles (reducing the tank requirement). Army National Guard procurement plans call for standardization on the up-gunned M1A1 tank, which involves transferring some M1A1s from the active force (210 scheduled at present) to replace old M1s sent to Anniston Army Depot for upgrade or remanufacture into engineering vehicles. Figures on the Army National Guard's tank equipment provided by Capt. Bill Zana, Director's Staff Group, National Guard Bureau, July 1999. Current plans call for 373 M1s to be sent to the depot.

16. In fact, the use of equipment freed up by force structure cuts to prolong the military's reequipment cycle was explicitly part of the Department of Defense's procurement strategy until 1995. Statement of Richard Davis, Director, National Security Analysis, National Security and International Affairs Division, U.S. General Accounting Office (GAO), *DOD Budget: Substantial Risks in Weapons Modernization Plans*, GAO/T-NSIAD-99-20 (Washington, D.C.: Government Printing Office [GPO], October 8, 1998), p. 3. Beginning in 1995, DoD joined the chorus lobbying for an upturn in "modernization" funding, despite the continuing availability of the surplus high-quality equipment.

17. The U.S. Army plans to buy 7 brigades worth of M1A2 SEP tanks for about \$5.7 million each; the total buy will be for 1,150 M1A2s. The rest of the Army will be upgraded to M1A1D tanks—M1A1s with appliqué digitization—at a cost of \$1 million per tank. "All Systems Go: Enhancement Package Provides for the 21st Century M1A2 Abrams," *International Defense Review*, July 1, 1998, p. 62. The cost figures are from Brian Shannon, "GD: Army Needs More M1A2s as Bridge to Future Tank," *Defense Daily*, February 25, 1998. The U.S. Army work on the M1A2 SEP tanks is scheduled to continue at least through 2005. George Cahlink, "Army and GD Reach Deal to Continue Tank Production," *Defense Daily*, September 16, 1998.

leave much of the Lima plant empty.<sup>18</sup> Even so, General Dynamics does not plan to build the new Advanced Amphibious Assault Vehicle for the Marine Corps in the Lima facility; instead, it will add manufacturing capacity elsewhere.

Moreover, United Defense Limited Partnership (UDLP), the other heavy armored vehicle manufacturer in the United States, also has substantial production overcapacity. Its York, Pennsylvania, factory recently delivered the last new Paladin self-propelled howitzer.<sup>19</sup> The factory is currently occupied with small-scale production of engineering vehicles and with an upgrade contract for M2 Bradley infantry fighting vehicles.<sup>20</sup> Deliveries of the Army's new Crusader howitzer, the next big project for the York plant, will begin soon,<sup>21</sup> but scheduled production will not fill the facility.<sup>22</sup> Given the overhang of Reagan-era tracked combat vehicles, almost all of UDLP's capacity is surplus. Meanwhile, it contributes to an expensive overhead bill picked up by the U.S. defense procurement budget.

The production capacity overhang at the other weapon platform manufacturers is just as huge. The U.S. force structure is much smaller than it was in the 1980s, leaving a lot of high-quality equipment to go around. The Navy has reduced its fleet size from 550 ships in 1987 to just over 320, and its force structure goal, set by the Quadrennial Defense Review (QDR) in 1997, calls for only 305 ships after 2003, including 116 surface combatants and 50 attack submarines. Many surface ships were mothballed in the mid-1990s before the ends of their scheduled service lives, and many of these are potentially available for a return to active service.<sup>23</sup> At the same time, the Air Force has cut

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18. Interviews at GDLS, Lima, Ohio, October 1996.

19. Scott R. Gourley, "U.S. Army Receives Final Paladin," *Jane's Defence Upgrades*, July 2, 1999.

20. The new engineering vehicles use the same chassis as GDLS' M1A1 Abrams tank. That similarity, intended to ease logistical and operational burdens in the active force, surely would also make consolidation of the UDLP and GDLS facilities particularly easy.

21. Rollout for the Crusader prototypes is scheduled for January 2000, while production versions are scheduled to be delivered in 2004. The loader vehicle for Crusader, which naturally uses the same underlying tracked vehicle, is being built at GDLS' Lima, Ohio, plant—another particularly egregious case of failure to consolidate related production lines.

22. U.S. Army, "Crusader—Advanced Field Artillery System: A Report to Congressional Defense Committees," February 1999.

23. Some of the ships that were retired early were not mothballed—notably the nuclear-powered cruisers, which are being destroyed as their reactors are decommissioned. Some retired frigates (FFG-7s) and destroyers (DD-963s and DDG-993s) have been sold or leased to foreign navies, so their availability "on the shelf" to extend the life of the U.S. fleet without new ship procurement is limited. But others of the retired ships are tied up at U.S. docks. Telephone interview with Ronald O'Rourke, specialist in national defense, Congressional Research Service, July 1999. See also Ernest Blazar, "300-Ship Navy," *Washington Times*, October 6, 1997, p. 5.

back from 37 wings to 12 active fighter-wing equivalents (plus 8 fighter-wing equivalents and 4 air defense squadrons totaling 3.2 wing equivalents in the Air National Guard and reserves).<sup>24</sup> As the force structure has been cut back, many aircraft have been sent to storage at Davis-Monthan Air Force Base in the Arizona desert—the Aerospace Maintenance and Regeneration Center (AMARC) or the “boneyard”—before their combat potential was exhausted.<sup>25</sup>

The stored aircraft and ships could be used to maintain the U.S. force structure for a number of years before new procurement is required. Yet 8 lines currently produce military aircraft, 6 private yards build large warships, and 5 helicopter companies depend on military purchases in addition to the lines working on land systems (see Table 1). Each of the shipbuilders, for example, is currently producing at less than 50 percent of its capacity. Three yards would provide sufficient capability and capacity to produce the full range of the Navy’s ships even if the rate of procurement were substantially increased.<sup>26</sup> Meanwhile, leftover Cold War equipment obviates requirements for new weapons production.

Maintaining the weapon production capacity of the Reagan buildup exacts substantial domestic costs. Production lines have high fixed costs that must be paid even for low-rate production. Each includes an engineering design team, specialized production equipment, and many skilled technicians and assemblers. Prime contracts also support networks of subcontractors.<sup>27</sup> Given the

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24. William S. Cohen, *Report of the Quadrennial Defense Review* (Washington, D.C.: GPO, May 1997), section 5.

25. Edward Duffner, “Warplanes Take Cover: Vast Resting Place for Aircraft in Arizona Symbol of America’s Shrinking Military,” *Dallas Morning News*, July 12, 1998, p. 1A; James Brooke, “Pentagon Used-Jet Sales Lot Helps Keep World Supplied,” *New York Times*, May 11, 1997, p. 16. The web site for AMARC, [www.dm.af.mil/amarc](http://www.dm.af.mil/amarc), includes an inventory of aircraft currently stored there along with the date at which those aircraft arrived at the base. Post-Cold War arrivals of tactical aircraft in the inventory (with arrival dates in parentheses) as of July 22, 1999, include 180 A-6Es (5/93–3/97); 148 A-10As (10/91–2/94); 107 F-14As (8/90–11/98); 105 F-15As and 10 F-15Bs (7/91–9/95); 323 F-16As, 36 F-16Bs, and 11 F-16Ns (4/92–9/98); and 47 F/A-18As (6/94–3/97). The web site does not list each airframe’s flight hours, so it is impossible to calculate from that publicly available data how much the stored inventory could contribute to extending the life of the U.S. military tactical aircraft inventory without replacement procurement. John Pike’s extensive military analysis pages on the Federation of American Scientists’ web site, [www.fas.org](http://www.fas.org), include aircraft-by-aircraft descriptions of capabilities and upgrades to U.S. types. Those pages note that operational experience and midlife testing of many tactical aircraft types have revealed that the aircraft can withstand many more flying hours than their initial design specifications called for. Many of the aircraft at AMARC also do not include the latest versions of avionics or other flight systems, although most could be upgraded for renewed flying status at relatively modest cost (many of the aircraft in the current active Air Force and Navy are products of such upgrades).

26. Sydney J. Freedberg, Jr., “Competition Dry-Docked,” *National Journal*, June 26, 1999, pp. 1886ff.

27. Prime contracts are agreements directly between the government and a private company. They are distinguished from subcontracts, which link prime contractors to lower-level suppliers.

**Table 1. Active Post-Cold War Production Lines.**

	Current Product	Likely Follow-on
<b>Aircraft</b>		
Lockheed—Marietta, Ga.	C-130	C-130J, F-22
Lockheed—Fort Worth, Tex.	F-16	Joint Strike Fighter
Lockheed—Palmdale, Calif.	Aurora <sup>a</sup>	Another secret aircraft
Northrop—Palmdale, Calif.	B-2	B-X
Northrop—Lake Charles, La.	JSTARS	Small surveillance aircraft
Northrop—St. Augustine, Fla.	E-2C	New Navy support aircraft
Boeing—St. Louis, Mo.	F-15, F/A-18C/D, AV-8B, T-45	F/A-18 E/F
Boeing—Long Beach, Calif.	C-17	C-17
<b>Helicopters</b>		
United Technologies-Sikorsky—Stratford, Conn.	UH-60 Blackhawk	CH-60, UH-60 Upgrade, Comanche
Boeing-Vertol—Philadelphia, Pa.	V-22	V-22, Comanche
Textron-Bell—Fort Worth, Tex.	OH-58D Kiowa Warrior, V-22	V-22
Boeing-Hughes—Mesa, Ariz.	AH-64D Apache Longbow	AH-64D
Kaman—Bloomfield, Conn.	SH-2 Seasprite (export)	SH-2G Super Seasprite (export)
<b>Shipyards</b>		
Newport News Shipbuilding—Newport News, Va.	CVN-77	CVNX, NSSN
Litton Ingalls—Pascagoula, Miss.	DDG-51, LHD	DD-21, LHD
General Dynamics-Bath Ironworks—Bath, Me.	DDG-51	DD-21, LPD-17
General Dynamics-Electric Boat—Groton, Conn.	SSN 21 (Seawolf)	NSSN
Litton-Avondale—Avondale, La.	LMSR, LPD-17	LPD-17, T-ADC(X)
General Dynamics-NASSCO—San Diego, Calif.	LMSR	T-ADC(X), JCC
<b>Armored Vehicles</b>		
General Dynamics—Lima, Ohio	M1A2	M1A3
General Dynamics—Woodbridge, Va.	AAAV Design	AAAV
United Defense—York, Pa.	Hercules, Grizzly, M2 Bradley	Crusader
General Motors—London, Ontario	LAV	LAV

<sup>a</sup> Aurora is allegedly a secret reconnaissance airplane built in Lockheed's Skunk Works. It is not officially acknowledged by the U.S. Air Force of DoD, but there is reason to believe that Skunk Works has a substantial project.

complexity of modern weapons, projects invariably cost billions of dollars. As the lines continue to be fed with production contracts, the defense budget stays high.

It is true that the defense budget has dropped in real terms during the 1990s, but at most a small fraction of those defense cuts can be attributed to the end of the Cold War. The limited budget decline hardly reflects an adjustment to the new strategic environment. The United States won the Cold War soon after its largest cyclical defense budget peak in 1986, and the defense budget should have been expected to drop substantially in the following decade even without the collapse of the Soviet Union. In fact, of the three major Cold War budget cycles, the aftermath of the Reagan buildup has had the gentlest downward defense budget trajectory (see Table 2 and Figure 1). Current outlays certainly do not reflect the major cutback (compared to the troughs of Cold War budget cycles) predicted by many early 1990s' analyses. The restrained post-Cold War defense budget cutback supports the overcapacity in the defense industrial base.

Pressure for further defense cuts has faded because the overall federal budget has moved into surplus. Yet many Americans, notably politicians, have attractive ideas in mind for spending the surplus on nondefense projects: "saving" Social Security and Medicare and funding tax cuts are especially popular proposals. Those jobs would be easier if the defense budget were trimmed.<sup>28</sup>

A new post-Cold War political coalition, however, is currently increasing the defense budget. The high operational tempo of the U.S. military, with its frequent peacekeeping deployments in the 1990s, ran up a tab in the operations and maintenance budget lines. It has been difficult to pay the bill for increased salaries, training, and other line items without raising defense spending. Critics of the high operational tempo, including the military services themselves, sought allies in the defense industry by arguing that the military's frequent peacekeeping deployments were diverting money from procurement to other defense budget line items.<sup>29</sup> The result was a new political coalition and a substantial increase in the real defense budget—much like the beginning of a new Cold War-era budget cycle, but this time without the Soviet threat.

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28. David Wessel and Greg Hitt, "Lawmakers Discover That Surpluses Can Be As Vexing As Deficits," *Wall Street Journal*, July 29, 1999, p. A1.

29. The QDR, for example, prominently featured the argument that funding for operations was displacing vital equipment modernization. See Davis, *DoD Budget*, p. 7.

**Table 2. Defense Budget Cycles (% of gross domestic product and billions of constant 1996 dollars).**

	Peak		Trough		Difference	Average Yearly Change
WW II	1944	39.3%	1948	3.7%	35.6%	-8.90%
	1945	\$753.5	1948	\$57.5	\$695.9	-\$232.0
Korea	1953	14.5%	1956	10.2%	4.3%	-1.43%
	1953	\$316.0	1956	\$243.9	\$72.1	-\$24.0
Vietnam	1968	9.6%	1978	4.8%	4.8%	-0.48%
	1968	\$358.0	1976	\$231.3	\$126.7	-\$15.8
Current	1986	6.5%	1997	3.3%	2.9%	-0.26%
	1989	\$355.9	1996	\$254.3	\$101	-\$14.5

SOURCE: 1998 Budget of the United States (Washington, D.C.: GPO, 1997).

Congress's April 1999 emergency funding bill for the Kosovo mission demonstrated the new political links. The bill passed by a huge margin, with many pork barrel projects attached to make the operations spending palatable.<sup>30</sup> The pork barrel procurement bonanza may not actually have been required politically to fund the Kosovo operation, but Congress's failure to pass a resolution supporting the bombing itself just days before the appropriations vote certainly suggests that the procurement aspects of the second bill may have played an important role.<sup>31</sup> And the marriage of convenience between operations and pork is likely to last. Political interests quickly converted lessons of the Kosovo experience from the operational realm into new plans to buy expensive equipment in the fiscal year (FY) 2000 budget—feeding the defense industry's production lines.<sup>32</sup>

In sum, despite the U.S. military's vast stocks of high-quality equipment, political pressure is driving the defense procurement budget upward. Defense plants, designed for high-rate Cold War production, are all still open. Unnec-

30. Cindy Williams, "Appropriations Piggyback," *Washington Post*, April 29, 1999, p. 33.

31. Embarrassment at the criticism heaped on Congress's failure to support the earlier bill also contributed to the second bill's easy passage.

32. James N. Thurman, "After Kosovo, U.S. Air Force and Army in a Tug of War," *Christian Science Monitor*, July 1, 1999, p. 2; Bradley Graham, "Air vs. Ground: The Fight Is On," *Washington Post*, June 22, 1999, p. 1; and Leslie Wayne, "Weapons Makers Seek Rise in Pentagon Spending," *New York Times*, May 19, 1999, p. 1.

essary production contracts in inefficient, oversized facilities waste U.S. resources.

### *Threat and the Politics of Defense Contracting*

In the wake of the Soviet Union's collapse, the incentives for U.S. defense contractors to lobby Congress and members' receptiveness to their efforts have changed. Private defense firms, faced with stranded fixed investments in production capacity, use political strategies to extend multibillion-dollar contracts—a very expensive way for the United States to maintain technology and skills. During the Cold War, the high level of perceived threat placed a premium on military expertise, which checked the contractors' political influence. Now, without the Soviet threat, contractors have too much influence over defense procurement decisions. That is the United States' post-Cold War defense industry burden. This section develops a threat-based theory of business-government relations in the modern defense sector.

Defense contractors lobby Congress constantly and aggressively; their skill in dealing with the government is in fact one of their core competencies. The standard explanation is that the distinguishing feature of the defense industry is that its customer is the government, which requires defense firms to invest in politics to win contracts. Cold War-era critics claimed that lobbying effort rather than technical competence and strategic requirements determined contract allocation decisions.<sup>33</sup>

Monopsony is only part of the explanation for defense firms' political activities, however. The other essential piece of the explanation for their lobbying is the high level of project-specific investment in physical and human capital required for the development and production of a major weapon system.<sup>34</sup> Defense contractors fear that sunk investment will be stranded if projects are cut—that is, their investment will not be adaptable for alternative uses except at great cost—so they seek to extend production runs.<sup>35</sup> During the Cold War,

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33. Ann Markusen and Joel Yudken, *Dismantling the Cold War Economy* (New York: Basic Books, 1992), p. xv; and J. Paul Dunne, "The Defense Industrial Base," in Keith Hartley and Todd Sandler, eds., *Handbook of Defense Economics* (Amsterdam: North-Holland, 1995), pp. 409–411, 422. Journalists often take this position, too; see John Mintz, "Arms and the Man to See as the Defense Industry Shrinks," *Washington Post National Weekly Edition*, December 19–25, 1994, p. 28. See also Seymour Melman, "Preparing for War (against Ourselves)," *New York Times*, June 26, 1995, p. A15.

34. For a similar theory of lobbying, see James E. Alt, Frederik Carlsen, Per Heum, and Kåre Johansen, "Asset Specificity and the Political Behavior of Firms: Lobbying for Subsidies in Norway," *International Organization*, Vol. 53, No. 1 (Winter 1999), pp. 102–103.

35. The political economy of lobbying by firms threatened with declining demand has been studied most often in the context of trade protectionism—by economists seeking to explain why

individual contracts were constantly threatened with cancellation even though the overall defense budget stayed high. Since the end of the Cold War, lobbying incentives have been compounded by slowing production rates that have left weapons plants nearly empty. Stranded investment acts as a barrier to exit, and investing in politics is the mechanism by which contractors keep plants open.<sup>36</sup>

Those who believe that lobbying dominated decisionmaking on defense contracts during the Cold War also generally believe that the business-government relationship was friendly, secure, and low risk, because defense contractors held the balance of political power over the procurement budget. The classic version of this military-industrial complex (MIC) theory is James Kurth's "follow-on imperative" hypothesis.<sup>37</sup> Kurth argued that in contrast to innovative high-technology sectors, the defense business was stable because the MIC created new jobs for prime contractors as they completed old projects. His most important piece of evidence was the amazing continuity in the list of top-ten defense contractors (measured by revenue) year after year during the Cold War. Somehow, Kurth noted, these firms arranged for new contracts,

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declining industries receive more government support than growing ones. In most industries, lobbying for protection is ineffective because it will stimulate entry to compete away rents. Ignatius J. Horstmann and James R. Markusen, "Up the Average Cost Curve: Inefficient Entry and the New Protectionism," *Journal of International Economics*, Vol. 20, Nos. 3/4 (May 1986), p. 226. As a result, politically active firms may be unable to recoup the costs of their investment in lobbying, and knowing of that risk firms will not bother to lobby in the first place. Jeffrey A. Frieden, "Invested Interests: The Politics of National Economic Policies in a World of Global Finance," *International Organization*, Vol. 45, No. 4 (Autumn 1991), p. 430. Having made fixed investments, however, firms faced with cuts in demand are willing to lobby, because new entrants will not be tempted into an industry facing shrinking demand. Richard Baldwin, "Asymmetric Lobbying Effects: Why Governments Pick Losers," mimeo, Graduate Institute of International Studies, Geneva, September 1993. In sectors threatened by declining demand like the post-Cold War defense industry, firms lobby in response to a barrier to exit—in order to maintain the normal rate of return longer than they otherwise would be able to.

36. Of course, there are probably structural barriers to entry in the defense sector, too, which theoretically suggest that defense firms may be able to sustain above-normal profits. Firms that have worked on defense projects in the past have unique information and technical knowledge necessary to develop and produce new weapons efficiently—information that potential entrants lack. At least during the Cold War, however, contractors were not generally able to force high-cost bids on a reluctant government buyer; instead, the government monopsony demanded extremely low bids from contractors most of the time, leaving projects vulnerable to cost overruns and contractors vulnerable to losses.

37. James R. Kurth, "The Political Economy of Weapons Procurement: The Follow-on Imperative," *American Economic Review*, Vol. 62, No. 2 (May 1972), pp. 304–311. The article is updated in Kurth, "The Military-Industrial Complex Revisited," in Joseph Krusel, ed., *American Defense Annual, 1989–1990* (Lexington, Mass.: Lexington Books, 1989); and Kurth, "The Follow-on Imperative in American Weapons Procurement, 1960–90," in Jurgen Brauer and Manas Chatterji, eds., *Economic Issues of Disarmament* (New York: New York University Press, 1993), pp. 304–321.

and because none seemed to fail in that effort, he concluded that investment in defense was low risk.

Yet Kurth's evidence is also consistent with an almost diametrically opposite interpretation—that the defense business was in fact risky during the Cold War. This interpretation provides a better explanation of the transmission mechanism linking firms' technical and political capabilities to high revenue, and it accounts for additional evidence that is not consistent with the follow-on theory. A more careful examination of Cold War history shows that major defense contractors sometimes did not receive follow-on contracts. Some smaller contractors were even forced out of the prime contracting business. Aircraft producers such as Curtiss-Wright, Fairchild, Republic, Rockwell, Martin, and Vought, and shipbuilders such as New York Shipyard, General Dynamics' Quincy, Massachusetts, yard, and Todd Shipyards all fell from the prime contracting ranks during the Cold War (see Table 3). Several of those companies went out of business entirely.

The key to accounting both for Kurth's observation that the top contractors rarely changed and for the fact that some firms did collapse is to separate the risks tied to specific weapons contracts from the risks borne at the firm level. Individual projects faced high levels of political and technological uncertainty: the requirements for contractor performance on development and production programs were always ambitious, and disappointing only a few high officials (generals or admirals) could doom a project. The way to please the customer was often to promise still more performance enhancements, which compounded technological uncertainty.<sup>38</sup> If contracts had been allocated purely on the basis of politics, the buyers presumably would have maximized employment in key congressional districts and paid little heed to the quality of weapons systems; the minimal role allotted to the military services in the MIC theory augurs ill for quality. Yet despite frequent cost overruns, schedule slippage, and failures to meet promised specifications, U.S. defense manufacturers during the Cold War generally developed high-quality weapons. Designs created by U.S. firms were more innovative and operationally successful than those of their Soviet competitors.<sup>39</sup> Responsiveness to the military cus-

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38. Harvey M. Sapolsky, "Equipping the Armed Forces," *Armed Forces & Society*, Vol. 14, No. 1 (Fall 1987), pp. 113–128.

39. See, for example, Michael E. Brown, *Flying Blind: Politics of the U.S. Strategic Bomber Program* (Ithaca, N.Y.: Cornell University Press, 1992). For a comparison of the U.S. and Soviet defense industries, see Matthew Evangelista, *Innovation and the Arms Race: How the United States and the Soviet Union Develop New Military Technologies* (Ithaca, N.Y.: Cornell University Press, 1988).

**Table 3. Partial List of Closed Prime Contractor Production Lines.**

Company	Plant	Last Project	Year
Curtiss Aircraft	Columbus, Ohio	F-87, SB2C	1951
Westinghouse	Kansas City, Mo.	J-40 engine	1955
Wright Aeronautical	Woodridge, N.J.	J-65 engine	1957
Martin	Baltimore, Md.	P5M-2	1960
Convair	San Diego, Calif.	F-106	1960
Chance-Vought	Dallas, Tex.	F8U-2N	1961
Republic	Farmingdale, N.Y.	F-105	1965
New York Ship	Camden, N.J.	Nuclear-powered ships	1967
LTV	Fort Worth, Tex.	A-7	1983
Fairchild	Hagerstown, Md.	A-10	1983
GD Quincy Shipyard	Quincy, Mass.	Navy auxiliary ships	1986
Todd Shipyards	Seattle, Wash.	FFG-7	1987
Fairchild	Farmingdale, N.Y.	T-46	1987
Todd Shipyards	San Pedro, Calif.	FFG-7	1988
Rockwell	Palmdale, Calif.	B-1B	1988
Grumman	Bethpage, N.Y.	F-14	1992 <sup>a</sup>

<sup>a</sup> Termination of F-14 upgrade project was inevitable with the Navy's decision to build the A-12, a joint effort of McDonnell Douglas and General Dynamics Forth Worth. The secretary of defense canceled the A-12 in 1991 contending that there was inadequate contractor performance.

tomers rather than to Congress was a highly prized, contract-winning trait during the Cold War.<sup>40</sup>

The exit of several of the smaller prime contractors from the first rank of the defense business when their single major project was terminated—the result of high contract-level risk—contradicts the predictions of MIC theorists. For example, Republic Aviation disappeared as a prime contractor in 1963, when the Air Force's desire for advanced technology fighters left the F-105 behind.<sup>41</sup> Meanwhile, the biggest companies held portfolios that included several major projects. Their revenues stayed high not because the defense business was "safe," but because at least one of their projects was always earning high returns for successful production. Their ties to multiple projects diversified

40. Eugene Gholz, "Ever Heard of Curtiss-Wright? Some Cold War Defense Firms Did Collapse," under review; and Harvey M. Sapolsky, *The Polaris System Development: Bureaucratic and Programmatic Success in Government* (Cambridge, Mass.: Harvard University Press, 1972), pp. 26, 206.

41. Miriam A. Ourin, *The Post-Layoff Labor Market Experiences of the Former Republic Aviation Corporation (Long Island) Workers* (Washington, D.C.: U. S. Arms Control and Disarmament Agency, August 1966), pp. 2-3.

their political and technological risks, and they stayed on Kurth's top-ten list. Only a severe disagreement with the military services could kill all of a big contractor's projects at once.

Such severe disagreements, in which the power of the military services trumped that of the contractors and their lobbyists, caused even large contractors occasionally to fall. Curtiss-Wright, for example, was the second biggest manufacturing firm in the United States in 1945. It made fighter and transport aircraft, aircraft engines, and propellers. Today it has a few hundred million dollars in sales and makes a limited line of aircraft components. The key to its downfall, which occurred during the very busy 1950s, when every other weapons maker was producing near capacity, was that the firm annoyed its principal—essentially only—customers, the U.S. Air Force and Navy. Curtiss-Wright acted as if its executives knew the follow-on imperative theory to be true: the company refused to accept technological risks and demanded ever-higher guaranteed rates of return from the military.<sup>42</sup> The Air Force turned instead to Pratt & Whitney's jet engines, terminating multiple Curtiss-Wright prime contracts in quick succession around 1957.

In contrast to that Cold War experience, current political trends may make the collapse of a major defense contractor like Curtiss-Wright nearly impossible. The reduction in the perceived strategic threat should change the government's responsiveness to lobbying. When the international threat is perceived as severe, as it was during most of the Cold War, the military services should consider it particularly important to buy the "right" weapons, squeezing pork barrel allocation of defense contracts out of the budget.<sup>43</sup> The U.S. Air Force was the first of the services to emphasize the pursuit of high technology not only in its weapons acquisition goals, but also in its organizational identity. But during the Cold War, when the United States adapted its tradition of capital-intensive warfare to face the Warsaw Pact's superior numbers, all of the services began to focus on maintaining a qualitative edge in equipment and in the training of individual soldiers.<sup>44</sup> Left to their own devices, the armed forces

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42. Gholz, "Ever Heard of Curtiss-Wright?"

43. Barry R. Posen, *The Sources of Military Doctrine: France, Britain, and Germany between the Wars* (Ithaca, N.Y.: Cornell University Press, 1984), pp. 40, 239–241. Sudden increases in defense spending during national security panics (e.g., the initial phases of hot wars and the Reagan buildup) should be expected to bring "waste, fraud, and abuse." But that outcome, which meets the casual definition of pork barrel politics, is not the same as the military-industrial complex argument that contractors held the balance of power in contract negotiations.

44. Carl H. Builder, *The Masks of War: American Military Styles in Strategy and Analysis* (Baltimore, Md.: Johns Hopkins University Press, 1989), pp. 21–24. Investment in technology frequently complements the use of skilled labor and substitutes for unskilled labor.

would orient their budgets to support those goals. And under the Cold War conditions of high threat, civilian defense analysts and congressional budget overseers often listened to the services' expert advice on procurement.<sup>45</sup>

On the other hand, when threat intensity drops, as it has in the 1990s, the services' interests in acquiring new weapons technology and in maintaining a core of highly trained war fighters may be subordinated to immediate demands for funding of operations and other congressional goals. The services have tolerated substantial cutbacks in personnel since the end of the Cold War, while military leaders have steadily tried to defend advanced technology weapons development and procurement. The Air Force, for example, has repeatedly called for an end to U.S. procurement of F-15 and F-16 fighters, because those programs threaten the Air Force's preferred new project, the F-22.<sup>46</sup> The Navy, meanwhile, has been willing to decommission nuclear cruisers, Spruance-class destroyers, and other ships ahead of schedule in an effort to shift money from their operations and maintenance accounts to upgrade other ships with advanced-technology Vertical Launch Systems for land attack and area-defense anti-air warfare.<sup>47</sup> Nevertheless, Congress each year has voted to divert funds to old weapons programs and to current operations budgets. Politicians are no longer as willing to defer to military experts on the budget, where service plans threaten defense industry employment at home in con-

45. Samuel P. Huntington, *The Soldier and the State: The Theory and the Politics of Civil-Military Relations* (Cambridge, Mass.: Harvard University Press, 1957), pp. 415–421.

46. The services are by no means identical in their preferences. The U.S. Army is most susceptible to a focus on its "end strength," although it has historically accepted considerable variation in the number of active divisions as long as its soldiers' training and readiness levels are maintained. Not surprisingly, the Army has recently been first to request additional funds for more personnel, while the Navy struggles to reverse declines in its fleet size (the number of capital ships and, recently in particular, the number of nuclear attack submarines). Meanwhile, the Air Force defends its new technology program, the F-22. Note that none of these service goals matches the congressional preference for preservation of employment in the defense industry via the allocation of production contracts to established production lines. For the Army, see Bradley Graham, "Army Chief May Seek Hike in Troop Levels; Gen. Shinseki Awaits Study Findings," *Washington Post*, June 24, 1999, p. A23; and Steven Lee Meyers, "Peace Strains the Army," *New York Times*, July 11, 1999, sec. 4, p. 4. For the Navy, see David Lerman, "Navy Secretary Urges New Look at Sufficiency of Submarine Fleet," *Newport News Daily Press*, June 25, 1999; and "Interview: Adm. Jay Johnson, U.S. Chief of Naval Operations," *Jane's Defence Weekly*, March 24, 1999. For the latest round of congressional attempts to shift funds from the F-22 to older production programs, see Kerry Gildea, "F-22 Compromise Option Would Restore \$1.8 Billion, Stagger Buys," *Aerospace Daily*, July 28, 1999, p. 139. For (skeptical) coverage of the Air Force's defense of the F-22, see Greg Schneider, "The World's Most Ambitious Fighter," *Baltimore Sun*, July 19, 1999, p. 1.

47. John Robinson, "Modernization Plan Would Boost Number of VLS Ships," *Defense Daily*, May 23, 1997. That modernization plan has recently been delayed, because the Navy budget has been shifted to the acquisition of additional new ships. "The Americas: U.S. Budget Special: U.S. Navy," *Jane's Defence Weekly*, February 3, 1999. See also "Danzig: Declining Navy Ship Numbers 'Not Everything,'" *Armed Forces Newswire Service*, March 4, 1999.

gressional districts. In a low-threat environment, defense procurement may be dominated by pork barrel incentives.

The defense business is not private-enterprise activity, even when direct ownership of the productive capacity is in private hands. The government, specifically the military and the Congress, is the market for the defense industries. When the military is politically strong, as when the nation feels a threat to its security, the services should be expected to choose the prime contractors they favor, to reward them, and to eliminate others. In a more benign threat environment, the balance of political power should rest instead with the Congress, which is concerned with district-level employment. At the time of the collapse of the Soviet Union, the threat to the United States dropped, so the threat-based theory of defense contracting suggests that pork barrel politics should now prevail in defense procurement decisionmaking. Congress may be awarding contracts to unnecessary production facilities to preserve defense jobs.<sup>48</sup> As a result of understandable political maneuvers, U.S. taxpayers pay an unnecessarily high defense budget bill.

### *Qualitative Evidence: No Production Lines Have Closed*

Two different lines of argument and conventional wisdom suggest that the capacity overhang problem is beginning to disappear. Some observers argue

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48. It might seem natural to test a hypothesis about congressional support for a particular pattern of procurement contracting using regressions of congressional voting patterns on various district characteristics—such as the level of defense contractor employment in the district. Cold War-era regression studies along these lines identified numerous problems in the data that made their results highly questionable. See, for example, Barry S. Rundquist, “On Testing a Military Industrial Complex Theory,” *American Politics Quarterly*, Vol. 6, No. 1 (January 1978), pp. 29–53. Moreover, the distribution of subcontracts across the country—“in every congressional district,” as prime contractors and their critics have sometimes proclaimed—is unlikely to make much difference in congressional voting, because only the final assembly plants have enough employment concentration to dominate the local economy and determine a legislator’s vote. See Kenneth R. Mayer, *The Political Economy of Defense Contracting* (New Haven, Conn.: Yale University Press, 1991), pp. 17–18, 33–35, 156–173. Occasionally, teaming arrangements can allow for more than one major employment concentration on a project, but the total number of major sites is still small: for example, the F/A-18 program has major factories with Boeing in St. Louis, Missouri, and with Northrop Grumman in El Segundo, California; the F-22 program is planned for a major presence at Lockheed Martin’s Fort Worth factory and one of Boeing’s Seattle factories, in addition to the final assembly site at Lockheed Martin’s Marietta, Georgia, plant. The key to congressional interest in major defense plants, however, is not that all representatives have factories in their districts. Instead, dominating the districts of a few key representatives can support a log-rolling coalition in Congress. Even individual representatives from districts that do not contain a major defense industry presence are unlikely to want to make a prominent crusade of voting to throw a large, identifiable group of defense industry workers out of their jobs.

that overcapacity is best left to market forces and that the wave of mergers sweeping the defense industry will rationalize production capacity.<sup>49</sup> Others argue that Department of Defense acquisition reform initiatives will integrate the defense industrial base with U.S. commercial high-tech industry, drawing new technologies and competitive efficiency into the defense market even as new access for defense firms to commercial markets stabilizes the defense industry's business cycle and preserves vital defense industrial capabilities.<sup>50</sup> Neither of these alleged solutions, however, has been effective in adjusting the defense industry to post-Cold War realities. Instead, politics dominates defense procurement. The explanation for the failure of each of these two "solutions" provides connective tissue that supports the threat-linked theory of the post-Cold War defense procurement pork barrel.

#### DEFENSE INDUSTRY MERGERS

The face of the defense industry has changed dramatically. The number of major active participants in the industry has declined precipitously. Nearly all of the diversified Fortune 500 firms—including IBM, General Electric, General Motors, Ford, Chrysler, Honeywell, Texas Instruments, and Westinghouse—have sold their defense subsidiaries. The firms that were more dependent upon defense have been the buyers, and many of them have also merged with other core defense firms. Several of the most famous corporate icons in the industry—McDonnell Douglas, Rockwell, and Hughes—have disappeared. Three giants now dominate defense production—Boeing, Lockheed Martin, and Raytheon—along with several other major players including Northrop Grumman, General Dynamics, and Litton.

Despite the changes in corporate nameplates, the mergers have not led to a true defense industry restructuring. As described in the first section, production capacity is largely unchanged. The specific political economy of the various defense industry mergers and merger proposals reveals the transmission mechanism for the maintenance of post-Cold War defense industry overcapacity: pork barrel politics undermined rationalization efforts. The Clinton administration initially recognized the need to overcome political barriers to defense

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49. See, for example, Chris Thornton, "Shaped to Compete: Consolidation Has Shaped the U.S. Military Aircraft Industry for the Challenges of the Next Decade," *Flight International*, September 1, 1999, p. 37; and Vago Muradian and Sheila Foote, "DoD: Industry Consolidation Cuts Capacity, but Not Competition," *Defense Daily*, April 9, 1997.

50. "Study Details Defense Industry Survival Needs," *Navy News & Undersea Technology*, March 6, 1995.

industry consolidation, but Congress has introduced regulatory hurdles to the implementation of the merger policy. The political environment has chilled contractors' incentives even to attempt plant-level restructuring.

John Deutch, the undersecretary of defense for technology and acquisition in the early Clinton years, introduced the government's pro-consolidation merger policy in July 1993. Deutch issued a memo clarifying the Department of Defense's interpretation of regulations on flexibly priced contracts (i.e., various forms of cost-plus and incentive contracts that are widely used for major weapon systems).<sup>51</sup> The new interpretation allowed contractors to include restructuring costs in the reimbursable cost base of merged contracts as long as the consolidation promised to result in long-run net savings to the defense budget.<sup>52</sup> The merger policy partially subsidized contractors' up-front costs of plant capacity consolidation. Had the policy been aggressively applied, the defense industry mergers might have led to a real restructuring and to more efficient post-Cold War defense procurement.

The flaw in the Clinton administration's merger policy that explains its political demise was its failure to do enough for workers and communities. Reimbursements for restructuring charges mostly went to company coffers, leaving workers and local officials with an incentive to lobby against the merger policy.<sup>53</sup> The payments were by no means pure profit for the firms, because they were linked directly to the corporations' expenses for equipment relocation, plant modification, and facilities disposition; 42 percent of the allowed costs went directly to those purposes, while the rest of the reimbursements were based on other cost categories.<sup>54</sup> The second biggest slice of the restructuring cost payments, 31 percent, was classified as "employee benefit costs," which include employee relocation, severance pay, retraining, and

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51. Restructuring costs associated with plant-level changes within a single firm had always been considered reimbursable. Defense industry mergers, however, often transfer flexibly priced contracts to a successor company, which requires a "novation agreement" signed by the transferring firm, by the recipient of the contract, and by the government. The Deutch memo explicitly allowed contractors to include consolidation costs in the reimbursable cost base of their novated contracts. U.S. GAO, *Defense Industry: Restructuring Costs Paid, Savings Realized, and Means to Ensure Benefits*, NSIAD-99-22 (Washington, D.C.: GPO, December 1998), pp. 2-3. For press coverage of the Deutch memo, see Thomas E. Ricks and Joe Danson, "Defense-Industry Mergers Will Get Pentagon Support," *Wall Street Journal*, September 1, 1993, p. A16; and Stephen C. LeSueur, "Merger Policy May Get Nod," *Defense News*, August 1-7, 1994, p. 1.

52. From the DoD perspective, consolidation reduces subsequent production costs that the government would otherwise pay as part of the flexibly priced contracts' terms.

53. John Mintz, "Union Hits Martin-Lockheed Merger," *Washington Post*, December 7, 1994, p. F3.

54. "Moving Fees, Worker Benefits Comprise Bulk of Defense Merger Costs," *Defense Week*, August 12, 1996.

medical insurance. But compared to the number of employees affected by the plant consolidations, that government payment was very small: as of 1997, the General Accounting Office reported that \$89 million had been spent on workforce reductions that affected almost 15,000 employees—a per worker payment of less than \$6,000.<sup>55</sup> Defense workers not surprisingly felt that the merger policy was not in their best interest.

Legislators responded to the workers' concerns by quickly passing laws to restrict consolidation cost reimbursement. Representative Lynn Schenk (D-Calif.), in whose San Diego district the merger policy helped close the General Dynamics missile plant (one of the few post-Cold War restructuring successes), called hearings in the summer of 1994. Schenk raised exactly the issue of protection of defense workers from the adjustment costs of the consolidation. The politically devastating slogan used by opponents of the merger policy was that it funded "Payoffs for Layoffs."<sup>56</sup> In the FY95 defense authorization bill, Congress required an assistant secretary of defense to sign off on an audited projection of net government savings before restructuring payments would be allowed. This legislation did give the merger policy explicit statutory authority, but it also increased the bureaucratic burden on its implementation.<sup>57</sup> Nor did congressional opposition to the merger policy subside after 1995. An outright ban on restructuring cost reimbursement nearly passed in the FY97 appropriations bill: the House passed it, but the Senate did not.<sup>58</sup> The compromise worked out in conference committee required mergers after September 30, 1996, to project savings to the government of at least \$2 for every \$1 of up-front cost reimbursement. This requirement entailed still more detailed government

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55. "Auditors Question Success of Defense Industry Restructuring," *Navy News and Undersea Technology*, April 14, 1997.

56. Representative Bernie Sanders (I-Vt.) and Representative Christopher Smith (R-N.J.) have repeatedly used the "payoffs for layoffs" language for political effect. Each year they have cosponsored bills to block DoD merger payments with inflammatory titles like the "Payoffs-for-Layoffs Corporate Welfare Elimination Act of 1997." Tom Harken (D-Iowa) has taken up their cause in the Senate. Philip Finnegan, "Consolidation Breeds Government Backlash," *Defense News*, February 17–23, 1997, p. 42. Congress has also repeatedly directed the GAO to study defense mergers and DoD compliance with congressional regulation of the merger policy's implementation. See U.S. GAO, *Defense Restructuring Costs, Payment Regulations Are Inconsistent with Legislation*, NSIAD-95-106 (Washington, D.C.: GPO, August 1995). For DoD's response, see "Specter Hits Claims that Policy Causes 'Payoffs for Layoffs,'" *Defense Week*, August 19, 1996.

57. See Section 818 of Public Law 103-337. Tony Capaccio, "Repeal 'Ineffective' 1994 Merger Law, Says Pentagon IG," *Defense News*, July 8, 1996.

58. Sheila Foote, "Appropriators Set Standard for DoD Payment of Merger Costs," *Defense Daily*, September 20, 1996.

auditing and certification of postmerger restructuring, which hampered consolidation efforts.<sup>59</sup>

More important, contractors got their customers' message: Congress does not look favorably on zealous efforts to rationalize plant capacity. Only a handful of contractors were able to qualify for DoD's reward for restructuring.<sup>60</sup> In the wake of the congressional restrictions, defense consolidation is back to the Bush administration position: the government verbally encourages mergers but lets the market decide the ultimate shape of the industry. The trouble with this policy is that the defense industry is not governed by normal market forces. Plants that would otherwise be forced to close, either via bankruptcy or a postmerger consolidation, can be kept open by aggressive lobbying, circumventing the market mechanism.

The defense firms' slow restructuring cannot be explained by the need for large firms to take time to "digest" mergers—that is, evaluating their business lines before consolidating and cutting away fat.<sup>61</sup> Large commercial firms that have recently merged—some with substantially larger revenue and business sprawl than the defense contractors—have restructured promptly. Plants have closed, and workers have lost their jobs. The day of their merger announcement, Exxon and Mobil announced 9,000 job cuts along with plans to close duplicative refining and chemical facilities. Even recent commercial mergers primarily explained as "market-expanding," like the Deutsche Bank-Bankers Trust linkup, included 5,500 layoffs.<sup>62</sup> Manufacturing mergers have

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59. U.S. Department of Defense, Office of the Inspector General, *Department of Defense Oversight of Defense Contractor Business Combinations*, Report No. PO-96-012 (June 28, 1996). See also "Perry Pentagon Will Ask Hill to Modify 1994 Merger Law," *Defense Week*, July 29, 1996.

60. As of December 31, 1997, DoD had issued nine merger-related reimbursement certifications associated with six business combinations. Hughes's application (which was approved) for merger-related cost reimbursement for its acquisition of General Dynamics' missile line predated the certification requirement. On December 31, 1997, six more restructuring proposals were pending, and DoD expected to receive additional proposals from Raytheon's acquisitions of Hughes and Texas Instruments and Boeing's acquisition of McDonnell Douglas. U.S. GAO, *Defense Industry Restructuring: Updated Cost and Savings Information*, NSIAD-98-156 (Washington, D.C.: GPO, April 1998), p. 3. DoD granted certification to two of the six pending proposals on October 14, 1998. In each instance of a post-1994 merger, however, the size of the authorized restructuring payments has been quite small, because contractors, who fear offending congressional appropriators, have not closed much capacity. For data on the amounts of the payments, see U.S. GAO, *Defense Industry: Restructuring Costs Paid*, pp. 1, 3. The bottom line is that congressional efforts have reduced both the number of restructuring proposals and the size of each restructuring effort.

61. Defense executives have sometimes explained their slow consolidation in those terms. Vago Muradian, "Boeing to Complete McDonnell Douglas Consolidation by 1998," *Defense Daily*, August 5, 1997.

62. Allan Sloan, "Mergers' Mixed Message: 'Buy, Buy, Traders! Bye-Bye, Employees!'" *Washington Post*, December 8, 1998, p. B3.

also quickly led to rationalization: Chrysler and Daimler-Benz were sharing production facilities within five months.<sup>63</sup> If the defense firms did not have the alternative strategy—lobbying for additional contracts—they ought to have radically redesigned the geography of their production facilities in the five-plus years of the defense merger wave.<sup>64</sup>

Several examples demonstrate the persistence of the capacity overhang problem despite the recent mergers. In 1994 Lockheed, with military aircraft lines in California and Georgia, acquired the General Dynamics' Fort Worth, Texas, division. Fort Worth produces F-16 fighters; California produced the F-117 fighter and continues to work on special aircraft projects; and Georgia primarily produces C-130 transports, although it is now beginning to assemble the F-22 fighter. In the wake of the acquisition, none of the plants was closed and consolidated with another underused facility.<sup>65</sup> Each production line has important supporters in Congress who steadily arrange new production contracts.<sup>66</sup>

Later Lockheed mergers show a difference in the treatment of defense and commercial assets: the chance to lobby for additional government contracts hindered the defense sector's restructuring, but it had no such effect on the commercial side. In 1995 Lockheed merged with another major defense firm, Martin Marietta, to form Lockheed Martin, which bought Loral, a defense electronics company, in 1996. Few defense plants were closed, but several facilities that served both commercial and military customers were—notably in the space launch sector.<sup>67</sup> Manufacturers cannot gain leverage against AT&T

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63. Brian Coleman, "A Daimler Factory Shows How a Trans-Atlantic Merger Works," *Wall Street Journal*, March 9, 1999, p. A18.

64. One reviewer suggested that firms avoid consolidation because moving production lines might disrupt workers' learning-curve benefits. The production of many weapon systems is, in fact, characterized by strong learning curves. But lowering manufacturing costs through the learning curve (or by any other means) will not make very much difference at low post-Cold War production rates. Furthermore, a consolidated production line offers much more potential for learning-curve benefits, because it concentrates experience on a particular group of workers. To the extent that learning-curve benefits within facilities can transfer across programs, mergers should increase rather than decrease the payoff from learning effects.

65. More recently, Lockheed Martin attempted (and failed) to acquire Northrop Grumman, the prime contractor for three production lines: the B-2 bomber, the JSTARS reconnaissance aircraft, and the Navy's E-2C airborne early-warning, command, and control aircraft. In discussions of that merger proposal, Lockheed Martin never indicated that it intended to close any lines.

66. David A. Fulghum, "F-22 Headed for Reprieve from Congressional Ax," *Aviation Week*, August 9, 1999, p. 28.

67. Interviews at Lockheed Martin, August 1996. See also John Mintz, "Taking a Painful Plunge; Lockheed Martin Prepares to Let People Go," *Washington Post*, April 16, 1995, p. H1; and Bruce Orwall, "Lockheed Martin to Close Eight Sites, Cut 1,600 Jobs in Streamlining Effort," *Wall Street Journal*, April 19, 1996, p. A2.

and other big commercial space launch customers through lobbying, so cost competitiveness—including production capacity rationalization—is an important strategy in the space launch businesses.<sup>68</sup> The defense sector, unfortunately, allows for political circumvention of these market pressures.

General Dynamics' acquisitions in the shipbuilding sector have been even more closely attuned to the politics of the post-Cold War defense industry. The firm has notably avoided capacity consolidation. Its first shipyard purchase was Bath Ironworks, which makes Arleigh Burke-class destroyers. Neither Bath nor General Dynamics' original Electric Boat division, which makes submarines in Connecticut, was slated to close. Instead, the acquisition was justified to shareholders on financial grounds: Bath, the biggest employer in Maine, is essentially guaranteed at least one destroyer contract each year in perpetuity, providing an assured income stream to General Dynamics.<sup>69</sup> Two relatively weak shipyards, each dependent on a political subsidy to stay in business, have joined forces. In a similar move in 1998, General Dynamics bought NASSCO, a West Coast manufacturer of auxiliary ships, with no significant capacity rationalization.<sup>70</sup> A consolidation-oriented merger would look very different, with a strong company buying a weaker one in order to shutter its competing capacity.

Early in 1999, General Dynamics tried to extend its shipyard acquisition streak with an unsolicited offer to buy Newport News Shipbuilding. The members of the Virginia congressional delegation, many of whom had previously supported the DoD merger policy, suddenly became antitrust hawks, fearful of further consolidation in the shipbuilding sector.<sup>71</sup> Senator John Warner (R-Va.), chairman of the Senate Armed Services Committee, is widely believed to have tipped the political balance against the merger because he

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68. Under the Pentagon's merger policy, DoD has paid for a share of Lockheed Martin's restructuring costs for the space launch sector (some \$70.3 million of a projected \$456.6 million as of the end of 1997), because DoD does account for a significant percentage of that business. DoD projects that the government will reap substantial savings on its future space launch procurement as a result of the restructuring. U.S. GAO, *Defense Industry: Restructuring Costs Paid*, pp. 3–5.

69. Byron Callan, "General Dynamics: What Acquisition Risk? BIW Deal a Plus," Merrill Lynch Report, August 28, 1995; and Stan Crock, "General Dynamics Sounds the Charge," *Business Week*, May 19, 1997, pp. 136–137.

70. Robert Holzer, "General Dynamics Will Not Close Newly Acquired Yard," *Defense News*, October 18, 1998, p. 24.

71. For the comments of Representative Herbert H. Bateman (R-Newport News, Va.) and Representative Norman Sisisky (D-Petersburg, Va.), see Dennis O'Brien, "Justice Department OKs Avondale Bid," *Newport News Daily Press*, February 23, 1999. Representative Sisisky is a senior member of the House Armed Services Committee. For an example of Sisisky's earlier support of the merger policy, see LeSueur, "Merger Policy May Get Nod," p. 28.

feared that Newport News' employment would be cut despite General Dynamics' track record and promises not to close any of its yards.<sup>72</sup>

Politicians and antitrust officials also alleged that the General Dynamics–Newport News Shipbuilding merger would threaten vital competition for future nuclear shipbuilding contracts.<sup>73</sup> The immediate rejection of yet another merger proposal, however, reveals the true political motivation for the government's resistance. Litton Industries, owners of the Ingalls Shipyard, proposed to buy Newport News in May 1999, just after the collapse of General Dynamics' offer. Ingalls produces a range of Navy ship types, but crucially an Ingalls–Newport News merger would not threaten the Pentagon's vaunted dual sourcing of nuclear submarines. Industry analysts widely expected the merger to be approved.<sup>74</sup> Like General Dynamics, Litton promised not to cut employment or restructure its postmerger yards to try to generate political support for the deal.<sup>75</sup> Defense Secretary William Cohen, however, seeking to revive aspects of the pro-consolidation merger policy, announced that DoD approval would be contingent on substantial plant-level restructuring; Newport News then announced its opposition to the deal, once again bringing Senator Warner's political leverage to bear.<sup>76</sup> Even without antitrust claims about the nuclear product segment, the Ingalls–Newport News combination failed in the face of congressional resistance to possible job cuts.

In sum, defense firms have consummated many *financial* mergers, but few of them have led to plant-level rationalization. The early mergers brought consolidation, because contractors' incentives to lobby for additional contracts in existing facilities were overcome by DoD's merger policy. That policy was too narrowly drawn, however: it did not provide enough compensation to workers and communities affected by plant closures, so it was undermined by political resistance. That result is in line with the expectations of the threat-based theory of post–Cold War procurement politics. In each major case of a merger that failed to consolidate defense production capacity (even if it did

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72. Tim Smart, "General Dynamics' Bid for Rival Is Threatened," *Washington Post*, March 5, 1999, p. E1; and Smart, "Pentagon Near Decision on Shipyard Merger," *Washington Post*, April 13, 1999, p. E3.

73. Electric Boat and Newport News are the only two nuclear-capable shipyards in the United States.

74. Andy Pasztor, "Litton Makes \$1.8 Billion Bid for Newport News, Avondale," *Wall Street Journal*, May 7, 1999.

75. Andy Pasztor, "Litton Gets Political, Investor Backing in Bids for Newport News, Avondale," *Wall Street Journal*, May 10, 1999, p. B2.

76. Steven Lipin, Rebecca Buckman, and Paul M. Sherer, "Litton to Attempt Rescue of Newport News Bid," *Wall Street Journal*, June 1, 1999, p. A3.

consolidate some commercially oriented capacity), congressional activity was the key mechanism blocking the restructuring. The defense industry mergers have failed to solve the post-Cold War burden of defense industry overcapacity.

#### ACQUISITION REFORM

Since the restrictions on the Deutch merger policy, the Clinton administration has offered two optimistic solutions when questioned about the excess capacity in the defense industry: conversion and acquisition reform. Both stem from the premise that commercial and defense producers are interchangeable, if the government's procurement regulations can just be changed in the right way to integrate the two markets. That premise is incorrect: the commercial and defense markets are inherently different. Acquisition reform is not the solution to the post-Cold War defense industrial overcapacity.

**CONVERSION.** Conversion may indeed be possible for subsystem contractors, especially small ones. Many had commercial customers throughout the Cold War and are accustomed to shifting from one market to another as economic conditions dictate.<sup>77</sup> These firms do not employ many workers concentrated in congressional districts that would give them the leverage to lobby for additional post-Cold War defense contracts. As a result, small dual-use firms have an incentive to implement defense conversion strategies.

At the same time, many large diversified firms, particularly the biggest, chose to exit the defense sector when the Cold War ended. The rules of modern management—concentrate on markets that are growing, where margins are high, and where one holds a commanding position—tend to dominate in firms such as General Electric and Ford. Their defense “conversion” rarely shifted assets formerly committed to defense into commercial production; instead, diversified firms spun off their defense divisions, selling them to the core defense suppliers.<sup>78</sup>

The defense-dedicated prime contractors, on the other hand, followed a different set of business rules, which led them to a different response to reduced international tension.<sup>79</sup> They specialize in dealing directly with the

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77. Maryellen R. Kelly and Todd A. Watkins, “In from the Cold: Prospects for Conversion of the Defense Industrial Base,” *Science*, April 28, 1995, pp. 525–533.

78. Michael Oden, “Cashing-In, Cashing-Out, and Converting: Restructuring of the Defense Industrial Base in the 1990s,” paper prepared for the Council on Foreign Relations’ Study Group on Consolidation, Downsizing, and Conversion in the U.S. Military Industrial Base, February 9, 1996, pp. 7, 12.

79. Ann Markusen, “The Economics of Defence Industry Mergers and Divestitures,” *Economic Affairs*, Vol. 17, No. 4 (December 1997), p. 28.

government on the United States' biggest projects—projects that are long-lived and politically visible. The firms' influence is enhanced by the concentration of employment in final assembly operations, with thousands of workers in a single facility. Because of their political visibility, prime contractors have an attractive alternative to desperation efforts to convert to commercial production: lobbying.

The commercial market potential for the largest post-Cold War defense companies looks bleak. To take one sector as an example, the shipbuilding industry was once considered a promising candidate for conversion.<sup>80</sup> Conversion among military shipbuilders is not a solution to today's defense overcapacity, however, for three reasons.

First, the revenue scales of the two businesses are completely different. In the military market, unit prices are extremely high. Each new Arleigh Burke-class destroyer costs nearly \$1 billion. Even the Navy's under-way replenishment ships, which do not deploy any advanced weapons systems but nonetheless are extremely sophisticated, are priced at more than \$500 million. Larger combatants are even more expensive.<sup>81</sup> The commercial market, by comparison, is a poor substitute. Shipping lines are indeed buying new ships, but none costs \$1 billion. For example, the oil companies need product tankers, particularly environmentally friendly ones, each of which sells for about \$40 million. Newport News attempted to enter the tanker production business with a government loan subsidy, but the return from the firm's investment in the project was not nearly enough to replace its business producing \$4 billion-plus aircraft carriers.<sup>82</sup> Cost overruns on the double-hulled tankers, which may be traced to Newport News' expensive, top-quality, Navy-oriented production practices, also resulted in a \$300 million loss, and Newport News is now retreating from commercial shipbuilding.<sup>83</sup> Not surprisingly, the shipyard continues to lobby hard for military contracts. That lobbying has been very successful: Congress allocated Newport News a share of development and

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80. Similarities between shipbuilding and large-scale construction were believed to offer hope. William R. Park and Robert E. Roberts, *Industrial Conversion Potential in the Shipbuilding Industry* (Washington, D.C.: U.S. Arms Control and Disarmament Agency Contract No. ACDA/E-66, March 1966). See also Greg Bischak, *U.S. Conversion after the Cold War, 1990-1997* (Bonn: Bonn International Center for Conversion, July 1997).

81. Extensive data including procurement costs for U.S. Navy ships are available on the Federation of American Scientists' Military Analysis Network at [www.fas.org](http://www.fas.org).

82. Interviews at Newport News Shipbuilding, fall 1995. See also Christopher Dinsmore, "Newport News Shipyard: Building for the Future," *The Virginian-Pilot & The Ledger-Star*, August 28, 1994, p. D1.

83. Daniel Machalaba, "U.S. Naval Shipbuilders Feeling Some Pressure to Consolidate," *Wall Street Journal*, February 24, 1999.

production on the new Virginia-class attack submarines—over the Navy’s objections.<sup>84</sup> Newport News has also received accelerated funding for the next nuclear-powered aircraft carrier.

Second, and worse still for the defense conversion cause, the federal government is paying subsidies to reopen shipyards in Boston and Philadelphia that will compete against the military-dependent yards for commercial business. The “big six” military shipyards (Newport News, Electric Boat, Ingalls, Avondale, Bath, and NASSCO) are not the only concentrated interests lobbying at the pork barrel.<sup>85</sup> Commercial shipbuilding is a declining industry, too.

Finally, since the 1960s, when commercial and military shipbuilding were considered relatively similar businesses from a technical standpoint, the military shipyards have specialized in fitting their products with complex electronics, plumbing, and damage-control systems. Commercial shipbuilding requires very different core competencies.<sup>86</sup> The yards that produce Arleigh Burke destroyers (Ingalls and Bath) have declared little desire to compete for commercial contracts, because their ships are distinguished by the Aegis air defense system, which is unlike any aspect of a commercial ship.<sup>87</sup> The yards that produce LMSR (large medium-speed roll-on roll-off) sealift ships (Avondale and NASSCO) do slightly more commercial work, because their Navy products are more directly comparable to commercial vessels, but that work does not represent a defense conversion success.<sup>88</sup> Avondale, for example, maintained its limited commercial business alongside its military business throughout the Reagan buildup—producing riverboat casinos and barges in its separate “lower yard” (the “upper yard” being devoted to military contracts). No shipyard capacity has been converted in adjusting to the post-Cold War world.<sup>89</sup> Market demands and production skills differ too much between defense and commercial projects.

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84. Ronald O'Rourke, “Navy Attack Submarine Programs: Background and Issues for Congress,” *Report for Congress* (Washington, D.C.: Congressional Research Service, February 4, 1999), pp. 9–13.

85. Richard Waters, “Philadelphia Seeking a Relaunch,” *Financial Times*, February 11, 1998, p. 5; “Shipyard Sham,” *Journal of Commerce*, December 18, 1997, p. 6A; and Jim Miara, “Emmanouil to the Rescue: Saving Fore River Shipyard,” *Boston Business Journal*, May 26, 1997.

86. Lauren B. Thompson, “U.S. Shipbuilders: The Tide Begins to Turn,” *Sea Power*, April 1, 1999, p. 63.

87. Interviews at Ingalls Shipbuilding, August 1995.

88. Ron McAlear, Vice President, Advanced Programs and Marketing, Avondale Shipyards, “Defense Conversion of United States Shipyards: The Problems and Potential Solutions,” paper presented to the Federal Bar Association, 1993, p. 6.

89. Interviews at Avondale Shipyards, August 1995. To carry through the Newport News Shipbuilding argument about the different revenue scales of the commercial and military businesses,

ACQUISITION REFORM. Acquisition reform is the Clinton administration's other favorite alternative to restructuring the defense sector.<sup>90</sup> Such reform will not help, and in fact it is likely to hurt. The Clinton administration advocates eliminating defense-unique production standards and wants to speed up the development cycle to make the acquisition process efficient.<sup>91</sup> But cutting cost at the margin is not going to change the overall defense budget situation much, if at all.

Some rules changes, of course, are desirable. In the 1980s, the Democrat-controlled Congress could not confront President Ronald Reagan directly over his popular defense buildup. Instead, it attempted to hobble the buildup through regulation. Democrats argued that they were not opposed to defense spending per se, but that they did object to waste, fraud, and abuse. Congressional Republicans joined in this stance so that they could point out that they did not vote blindly for defense. Dozens of laws were passed requiring contract reviews, rewards for whistle blowing, social engineering through contracting, audits, and more audits.<sup>92</sup> Post-Cold War politicians should recognize the burden that these laws place on the government and seek their repeal, at least selectively.

On the other hand, the benefits of acquisition reform can easily be exaggerated, and that exaggeration can lead to bad procurement choices that overwhelm any efficiency gains. The rhetoric of reform allows politicians to give voters the illusion that additional defense spending is a cost-effective investment in national security. The participation of the F-22 program office in the Air Force's "Lean Aircraft Initiative," which claims that new manufacturing techniques will substantially reduce unit costs, is a leading example of the political cover that acquisition reform provides to some very expensive programs.<sup>93</sup> U.S. F-15s, F-16s, and F-18s are already better than any other country's fighters; with the end of the Cold War, doubts about the value added of new systems like the F-22 are growing. Unfortunately for acquisition reform, a

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Avondale executives estimated that it would require them to build heavy-lift commercial ships to match the value of a single Navy sealift ship contract.

90. Bob Brewin, "Acquisition Reform Key to Defense, Cohen Says," *Federal Computer Week*, May 11, 1998, p. 10; "Blueprint for Change," edited excerpts of a news briefing by Secretary of Defense William Perry and Deputy Undersecretary Colleen Preston, Pentagon, June 29, 1994.

91. William Perry, *Blueprint for Change* (Washington, D.C.: National Technical Information Service, 1994); John A. Alic, L.M. Branscomb, A.B. Carter, and G.L. Epstein, *Beyond Spinoff: Military and Commercial Technologies in a Changing World* (Boston, Mass.: Harvard Business School Press, 1992).

92. Daniel Wirls, *Buildup: The Politics of Defense in the Reagan Era* (Ithaca, N.Y.: Cornell University Press, 1992).

93. Greg Schneider, "Red-Hot Fighter, Trail of Deception," *Baltimore Sun*, July 18, 1999, p. 1.

standard congressional reaction to political uncertainty is to slow down production rates, limiting savings from manufacturing efficiency.<sup>94</sup> Meanwhile, the risk is that the pro-efficiency reform advocates will give defense contractors the political capital and Congress the political cover to purchase unneeded, expensive weapons systems at uneconomical production rates. The illusion of a bargain can be powerful incentive to buy.

The other purported benefit of acquisition reform, speeding up the development cycle, makes even less sense. The hopeful belief is that if the procurement process moves fast, the political uncertainty that besets weapons projects can be overcome.<sup>95</sup> Some think that once politicians show an interest in a new aircraft, it should be built before they change their minds. It is physically impossible, however, to build weapon systems that fast. Worse, accelerating projects increases technological uncertainty. Compressing development times, trimming test schedules, and so on is a formula for guaranteeing performance shortfalls and cost overruns.<sup>96</sup> Meanwhile, the frequently voiced fear that U.S. national security will be damaged by the failure to plug the latest “commercial off-the-shelf” electronics into U.S. weapon systems is hollow, because no other country implements upgrades faster than the United States. U.S. weapon system computers do not compete in benchmark tests with the latest commercial models; they compete in combat with adversaries’ military computers. Post-Cold War adversaries are less technically and financially capable than the Cold War Soviet Union was, but even the Soviets generally failed to push the technological state of the art. Military-specific upgrade programs for U.S. weapons should proceed carefully, with extensive prototype development and testing to reduce technological uncertainty. That U.S. weapons development can afford to go slow is one of the benefits of the end of the Cold War.

Neither of the two solutions often alleged to be solving the defense industry capacity overhang is accomplishing that goal. Post-Cold War defense mergers have not closed plants, and restrictions on DoD’s pro-consolidation merger policy diminish the prospects for future mergers and plant closures. Acquisition reforms to promote commercial-military integration of the industrial base—including policy efforts to stimulate defense conversion—have failed to

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94. Harvey M. Sapolsky, Eugene Gholz, and Ethan McKinney, “The Quest for Weapons Acquisition Reform,” unpublished manuscript, 1999.

95. Interviews with participants in the Lean Aircraft Initiative. See also Bill Lewandowski, “Acquisition Reform: Picking the Low-Hanging Fruit,” *Aerospace Industries Association Newsletter*, Vol. 7, No. 7 (January/February 1995).

96. Brown, *Flying Blind*, pp. 16–27.

attract the sustained interest of defense-oriented firms. Prime contractors prefer to focus on their core competencies: dealing with the government on large-scale, technically sophisticated contracts. In each case, the political alternative to carrying through the hoped-for consolidation or conversion plan has undermined the proposed solution to defense industry overcapacity. The qualitative evidence from the case studies provides strong support for the threat-based theory of the political economy of defense procurement.

### *Quantitative Evidence: CAPM and the Defense Industry*

The change that the collapse of the Soviet threat wrought in the politics of defense contracting can also be seen in stock market data on the defense industry. Earnings reports, the results of competitions for defense contracts, and other data on defense firms immediately drive stock price changes. The threat-based theory of defense procurement is not concerned with the *price* of individual defense contractors' stocks, but it does make predictions about the *riskiness* of investing in the defense sector. If contract allocation in a low-threat strategic environment follows a more stable, politicized process than allocation in a relatively high-threat environment, then the riskiness of defense investment should have dropped at the end of the Cold War.

The tests of that hypothesis center on estimates of "beta" ( $\beta$ ), a measurement of systematic risk. Modern portfolio theory assumes that all else being equal, investors prefer assets with lower variance in their rates of return—just as all else being equal, they prefer investment vehicles with higher returns. The Capital Asset Pricing Model (CAPM) is a particular extension of modern portfolio theory that quantifies the trade-off between risk and return.<sup>97</sup> The CAPM argues that the systematic risk associated with ownership of any particular stock can be measured by that stock's contribution to the variation in

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97. Since the introduction of the CAPM in the 1960s, there have been many attempts to test and improve it. Although some of the CAPM's assumptions about investor behavior have proven unrealistic, CAPM remains the first-cut financial model for examining risk and return in stock market investments. The basic model still has defenders among finance scholars, and it is often the starting point in both introductory and more advanced finance texts. See, for example, Richard A. Brealey and Stewart C. Meyers, *Principles of Corporate Finance*, 5th ed. (New York: McGraw-Hill, 1996), chaps. 7–8; and David G. Luenberger, *Investment Science* (New York: Oxford University Press, 1998), chaps. 6–8. For an accessible review of the assumptions of the CAPM and efforts to test its empirical validity, see Diana R. Harrington, *Modern Portfolio Theory, the Capital Asset Pricing Model, and Arbitrage Pricing Theory: A User's Guide*, 2d ed. (Englewood Cliffs, N.J.: Prentice-Hall, 1987).

the returns of the market as a whole.<sup>98</sup> Systematic risk can be estimated statistically by regressing a stock's rate of return on the rate of return of the entire stock market; the regression coefficient is known as  $\beta$ .<sup>99</sup> Risky stocks' rates of return amplify the variance in the market rate of return, and their measured  $\beta$  is high (greater than one); by contrast,  $\beta$  is low (less than one) for low-risk "safe havens."

The CAPM naturally suggests that exogenous changes in the riskiness of market conditions affecting a particular firm (or industry) should be reflected in changes in that firm's beta (or in the beta of an industry-specific portfolio of stocks). Economists have frequently used this prediction to study the effects of regulatory changes on particular firms or industries; the method is known as an "event study." Betas are simply computed for the periods before and after an unanticipated regulatory action becomes widely known to investors (the event), and the statistical significance of any change in the level of  $\beta$  is assessed.<sup>100</sup>

Analysts have used stock market data before to test hypotheses about the effectiveness of Cold War defense procurement regulations, but these studies have focused on whether defense firms earned excess returns rather than on

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98. Variation in the stock's rate of return that is not correlated with variation in the market's rate of return is called "diversifiable" or "firm-specific risk," because it can be averaged out by investors who own portfolios of imperfectly correlated investments. The key insight of the CAPM is that portfolios that minimize risk for a given level of return are all linear combinations of two assets: the ideal risk-bearing asset (the market portfolio) and the risk-free asset. In CAPM-based studies, the rate of return on a value-weighted portfolio of all NYSE, AMEX, and NASDAQ stocks is frequently used to operationalize the ideal risk-bearing asset. The risk-free asset is usually operationalized as a short-term U.S. Treasury bill held to maturity.

99. That regression is known as the "simple market model," and it does not require all of the assumptions of the CAPM. The estimate of  $\beta$  from the simple market model is equivalent to the estimate from the "risk-premium version" of the market model, which is based on calculating the covariance between a stock's return above the rate of return of a risk-free asset and the market return above the rate of return of the risk-free asset. The risk-premium version adds complexity to the empirical estimation process, because the risk-free asset must be operationalized and no perfect measure of the risk-free rate of return is available. The risk-premium version of the model is required to estimate the size of an excess return rather than a change in an investment's risk profile. Because this article focuses on risk, the simple market model is sufficient. Harrington, *Modern Portfolio Theory*, pp. 102–108, 117–118.

100. For an accessible introduction, see Ernst Berndt, *The Practice of Econometrics: Classic and Contemporary* (Reading, Mass.: Addison-Wesley, 1991), pp. 35, 48–50. For a more rigorous treatment, see G. William Schwert, "Using Financial Data to Measure the Effects of Regulation," *Journal of Law and Economics*, Vol. 24, No. 1 (April 1981), pp. 125–127. Because groups of related stocks are expected to react similarly to new information, measurements of  $\beta$  for individual stocks suffer from contemporaneous correlation of errors. As a result, the preferred method of implementing event studies is to measure betas for portfolios rather than for individual stocks. Schwert, "Using Financial Data," pp. 130–133. Contemporaneous correlation of errors introduces bias in ordinary least-squares regressions with relatively small samples. See Peter Kennedy, *A Guide to Econometrics*,

changes in the level of systematic risk in the defense industry. In an early study, George Stigler and Claire Friedland applied a pre-CAPM research design and found that although defense contractors were more profitable than the average U.S. company in the 1950s (but not the 1960s), the defense investment was also riskier. They argued that the higher returns could simply have reflected the risk premium demanded by investors.<sup>101</sup> Later research by James Bicksler and Patrick Hess supported that argument using the more rigorous CAPM framework.<sup>102</sup> Both articles contradict the military-industrial complex theory, which holds that contractors' political influence should be expected to have dominated the Cold War procurement process. Contractor dominance was widely predicted to allow excess profits in the defense sector, but those predictions of excess profits did not obtain.<sup>103</sup>

The main value added by the quantitative tests in the present article is the event study of the end of the Cold War—comparing the riskiness of defense investment under high-threat and low-threat conditions. The stock market data provide a “hoop” test of the hypothesis that the low strategic threat in the post-Cold War world has changed the politics of defense procurement.<sup>104</sup> The quantitative data do not offer evidence with respect to the theory's transmission mechanism, but the model does predict a correlation between the end of the Cold War and a reduction in the riskiness of investments in defense firms. If the measured riskiness failed to decrease at the end of the Cold War, that would be significant evidence against the theory, but if the riskiness did in fact drop, that should not be interpreted as strong support. Some other factor besides the change in the threat environment may have caused the reduction in risk. If the timing of the drop in defense firms' betas closely coincides with

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3d ed. (Cambridge, Mass.: MIT Press, 1992), pp. 134–135. For comparisons of individual defense stocks' betas in this study, daily changes in their rates of return were used, vastly increasing the number of observations and minimizing any bias.

101. George J. Stigler and Claire Friedland, “Profits of Defense Contractors,” *American Economic Review*, Vol. 61, No. 4 (September 1971), pp. 692–694.

102. James Bicksler and Patrick J. Hess, “A Note on the Profits and Riskiness of Defense Contractors,” *Journal of Business*, Vol. 49, No. 4 (October 1976), pp. 555–557. Ironically, Bicksler and Hess intended their work as a critique of Stigler and Friedland.

103. For similar CAPM-based evidence, see Alan P. Mayer-Sommer and James P. Bedingfield, “A Reexamination of the Relative Profitability of the U.S. Defense Industry: 1968–1977,” *Journal of Accounting and Public Policy*, Vol. 8, No. 2 (Summer 1989), pp. 98–102, 111. Profit levels for the defense industry firms in this study were not statistically different from those of commercially oriented firms in similar industrial classifications that had similar betas.

104. Stephen Van Evera has drawn the analogy between this type of test and the requirement that the theory “jump through a hoop”—a not-so-challenging test whose failure would be very embarrassing to a theory's advocates. See Van Evera, *Guide to Methodology for Students of Political Science* (Cambridge, Mass.: MIT Defense and Arms Control Studies Program, 1996), pp. 17–18.

the end of the Cold War, however, then the range of possible alternative explanations should be limited. That congruence test should increase the level of confidence in the hypothesized connection between threat and the political economy of defense procurement.<sup>105</sup>

Measurements of beta for the prime defense contractors around the time of the end of the Cold War show the predicted drop in risk. Figure 2 graphs a time series of estimates of beta for an equally weighted portfolio of seventeen defense contractors.<sup>106</sup> All betas for the period before the fall of the Berlin Wall are higher than all betas for the period after the collapse of the Soviet Union. The historical betas are not constant in either period—that is, other information besides the threat environment also influenced the riskiness of defense investment—but the threat environment set a baseline to which the other information added variation.<sup>107</sup> Further details are shown in Table 4, which reports the numerical results of the event study comparing the betas of leading defense stocks during the Cold War to their post-Cold War values.<sup>108</sup> Across the board, the riskiness of investing in defense firms dropped after the end of the Cold War. Despite the rhetoric about the uncertain and costly defense industry downsizing, investors apparently understand that returns in the post-Cold War defense industry are relatively stable.

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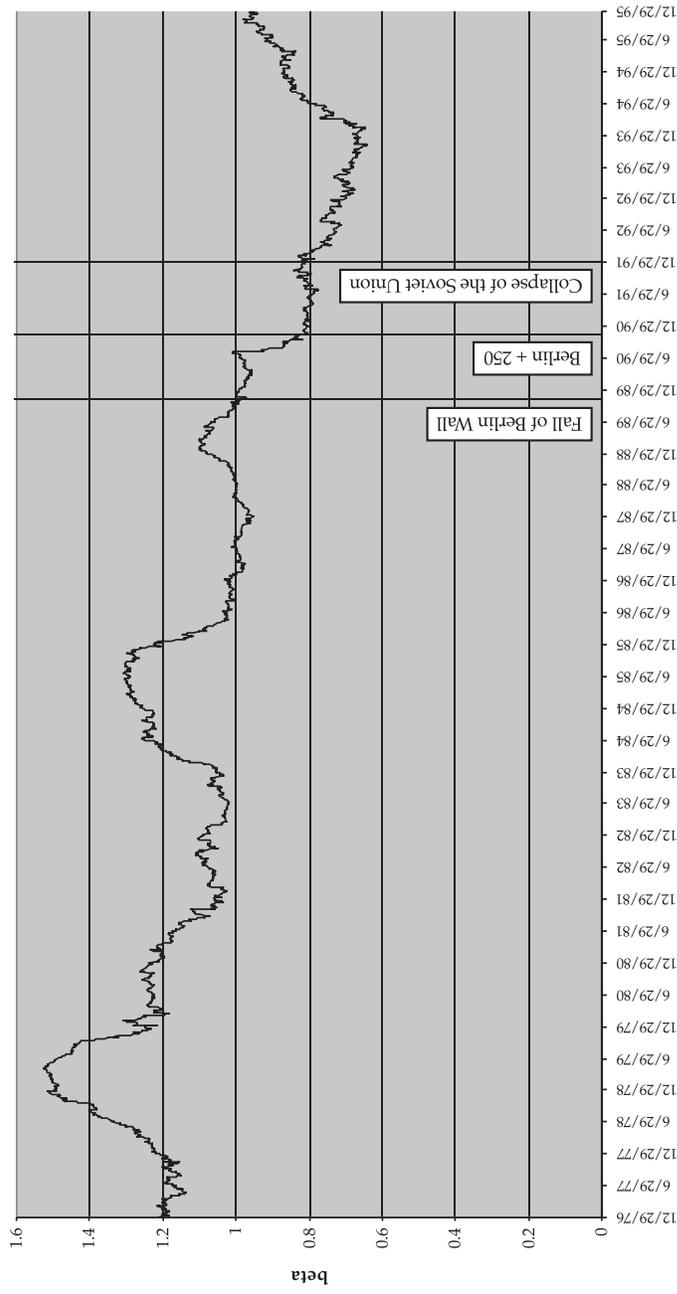
105. One possible alternative theory often suggested in interviews with defense contractor executives is that the firms implemented reforms in the manufacturing capabilities (such as “lean manufacturing”) beginning in the early 1990s, which changed the economics of defense production irrespective of any political changes and might have lowered estimated betas. This view was developed, for example, during interviews with a senior executive from Lockheed Martin’s Fort Worth division, November 1997.

106. The contractors in the portfolio are listed in Table 4. The Y-axis value for each point is an estimate of beta using the 250 previous trading days’ rates of return. Data were taken from Center for Research in Security Prices tapes.

107. Note that the estimate of beta for November 17, 1989—one week after the wall came down—includes only one day’s observation of “post-Cold War” behavior (six days are allowed for the market to adjust to the new information). The first beta estimate graphed that includes no independent variable data from before the fall of the wall is November 8, 1990. The event’s effect should gradually manifest during the period bounded by the vertical lines for the fall of the Wall and “Berlin + 250 days.”

108. The Cold War period included all trades between January 2, 1976, and November 9, 1989—basically a full defense budget cycle. The post-Cold War regressions begin in January 1991, after the final collapse of the Soviet Union. The data set ends on December 29, 1995. The column for the narrow event window reports the change in betas in response just to the fall of the Berlin Wall (the event window is defined as one week’s worth of trading, after which the market is taken to have integrated into investment decisions the information on the effect of the fall of the wall). All reported betas were statistically significant at the .01 confidence level, as were the changes in the betas between the two periods except as noted in the table. The reported betas are essentially averages over long periods of time—the baseline level.

Figure 2. Beta for Defense Portfolio (all firms), 1976-95.



**Table 4. Average Betas for Major Defense Contractors.**

Company	Average Beta during the Cold War	Change to Post-Cold War Beta	Change with Narrow Event Window
Boeing	1.32	-0.51	-0.18
E Systems	1.11	-0.49	-0.45
FMC	1.00	-0.48	-0.31
General Dynamics	1.21	-0.53	-0.59
General Electric	1.22	-0.20	-0.02 <sup>a</sup>
Grumman	1.06	-0.32	-0.38
Litton	1.20	-0.43	-0.52
Lockheed	1.38	-0.63	-0.65
Loral	1.18	-0.19 <sup>a</sup>	-0.36
Martin Marietta	0.96	-0.24	-0.31
McDonnell Douglas	1.10	-0.12 <sup>a</sup>	-0.17 <sup>b</sup>
Northrop	1.12	-0.28	-0.33
Raytheon	1.17	-0.56	-0.69
Rockwell	1.17	-0.30	-0.17
Textron	0.85	-0.08 <sup>a</sup>	-0.01 <sup>a</sup>
TRW	0.96	-0.26	-0.14
United Technologies	1.22	-0.23	-0.21
All firm portfolio	1.13	-0.33	-0.32
Nonmerger portfolio	1.14	-0.28	-0.24
Core defense portfolio	1.15	-0.34	-0.41
Diversified defense portfolio	1.11	-0.35	-0.25

<sup>a</sup> Indicates that the value is not significant at the .10 confidence level.

<sup>b</sup> Indicates that the value is significant at the .05 confidence level.

A reasonable additional prediction of the threat-based theory of the politics of defense procurement might be that the betas of particularly defense-dependant firms should be more affected by the end of the Cold War than the betas of firms with broader commercial-military diversification. Theory testing based on such auxiliary predictions should be taken as relatively strong evidence in a theory's favor—if empirical investigation confirms that the predicted values obtain.<sup>109</sup> In this case, the statistical evidence provides mixed support for the auxiliary hypothesis (see bottom two rows of Table 4). The stock market behavior of an equally weighted portfolio of the most defense-dependent firms in the data set reacted more strongly to the news of the fall of the Berlin Wall than the rest of the data set did.<sup>110</sup> That is, the beta of the core defense portfolio

109. Van Evera, *Guide to Methodology*, pp. 15–16.

110. The defense-dependent portfolio included General Dynamics, Grumman, Litton, Lockheed, Loral, Martin Marietta, McDonnell Douglas, and Northrop. Each of the listed firms was one of the

dropped by more than the beta of the relatively diversified prime defense contractors.<sup>111</sup> It is not clear, however, that investors knew that the Cold War was over simply because the Berlin Wall came down. Deferring the start of the post-Cold War era until after the collapse of the Soviet Union for purposes of the statistical test offers a less efficient but more conservative estimate of the effect of the end of the Cold War on the riskiness of defense stocks.<sup>112</sup> Using this broad event window, the change in beta of the defense-dependent portfolio is not statistically distinguishable from the change in beta of the relatively diversified defense portfolio.<sup>113</sup> Detailed examination of the data shows that the relatively diversified stocks reacted with a constant drop in beta (the estimate was unaffected by the change in the length of the event window), while the core defense stocks initially overshot the long-run reduction in beta. By the time of the fall of the Soviet Union, the beta for the core defense portfolio drifted back to the same level as the beta for the more diversified portfolio.<sup>114</sup> The apparent exaggeration in the initial response of the variance in the core defense portfolio to the news of the fall of the Berlin Wall may be interpreted as limited support for the auxiliary hypothesis—but only as limited support.

In general, the quantitative results are consistent with the hypothesized political allocation of major weapon platform contracts in the post-Cold War era. To the extent that the theoretical CAPM accurately describes reality, it allows direct measurement of changes in the riskiness of the defense industry. The post-Cold War estimate of beta for each of the leading prime defense

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top-ten defense contractors in 1993 by revenue, and each drew more than 50 percent of its revenue from DoD contracts. U.S. GAO, *Defense Contractors: Pay, Benefits, and Restructuring during Defense Downsizing*, NSIAD-96-19BR (Washington, D.C.: GPO, October 1995), p. 32.

111. An *F*-test was used to compare the regression coefficients for the post-Cold War changes in beta in the two portfolios. The *F*-statistic with 1 numerator and 5,020 denominator degrees of freedom was 18.14—statistically significant beyond the .0001 confidence level.

112. By January 2, 1992, any transitional uncertainty about whether the Cold War had ended had certainly passed; however, the broad event window regressions drop some data from the period between November 20, 1989, and December 31, 1991, that in truth reflects the post-Cold War beta of the defense stocks. Table 4 reports the results of the regressions for all of the individual defense stocks and for all of the portfolios for both the narrow (Berlin Wall) and the broad (end of the Soviet Union) event windows.

113. Again, an *F*-test was used to compare the regression coefficients for the post-Cold War change in  $\beta$ . The result with 1 numerator and 4,486 denominator degrees of freedom was an *F*-statistic of only 0.04. Remember that both portfolios still reacted significantly differently from the commercially dominated market as a whole.

114. Similar *F*-tests were performed for intermediate-length event windows. The results of those tests followed the “core defense overshoot” pattern. The confidence level at which the null hypothesis that the two portfolios were drawn from the same group of contractors could be rejected gradually dropped below all reasonable standards of significance as the event window expanded.

contractors was lower than the comparable Cold War estimate. The lower estimate of beta suggests that the riskiness of the defense sector declined, as predicted by the threat-based theory.<sup>115</sup>

### *From Pork to Spam: Policy for Private Arsenals*

The U.S. government needs a new defense industrial policy to respond to contractors' overcapacity because mergers are not helping, conversion offers little hope, and acquisition reform will only make matters worse. Contractors are doing what they do quite well: lobbying to keep lines running, if only slowly. Politically, the contractors' efforts resonate because the lines represent big lumps of employment. The way out of this bind must change the political incentives of the pork barrel interest-group coalition. We offer a three-step proposal to adjust contractors' capacity to the post-Cold War threat environment.

The U.S. military managed the politics of the defense industrial base successfully in the past. After World War I, U.S. submarine makers built no new boats for eight years, but they kept developing the technology.<sup>116</sup> Submariners forced the Lake Boat Company to close, helping its competitor, Electric Boat, because it had the better facility. To keep Electric Boat focused, the Navy gradually developed submarine construction capacity at Portsmouth, New Hampshire, a public yard. During the 1920s and early 1930s, submariners brought in foreign component technology and worked on their offensive doctrine and new submarine designs. The result was the effective fleet boat of World War II and the strategy that helped defeat Japan.<sup>117</sup>

Today many legal obstacles block such efforts by the services to protect U.S. national interest. Moreover, in the absence of a strong overseas threat, political incentives work against such initiatives by the services. And the longevity of the Cold War drew a stronger private interest group presence into the defense industrial base, raising new resistance to consolidation plans. Private firms with sunk costs in existing overcapacity face barriers to exit, hence their current

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115. We would like to thank Steven Ansolabehere of the MIT Department of Political Science for suggesting the event study methodology to estimate the effects of the end of the Cold War on the defense industry.

116. Gary E. Weir, *Building American Submarines, 1914–1940* (Washington, D.C.: Naval Historical Center, 1991).

117. Carl Boyd and Akihiko Yoshida, *The Japanese Submarine Force and World War II* (Annapolis, Md.: Naval Institute Press, 1995); and Mark P. Parillo, *The Japanese Merchant Marine in World War II* (Annapolis, Md.: Naval Institute Press, 1993).

aggressive lobbying strategy. That political offensive, which props up the defense budget, can and should be countered.

OFFER AN EXIT SUBSIDY

It is time to buy out excess capacity. The current merger policy has only been partially effective: it has encouraged corporate mergers without plant-level restructuring. Congressional interest in preserving employment has combined with corporate interest in sustaining production to circumvent normal market forces, limiting consolidation through political means. A properly designed subsidy to plant-level restructuring would provide a ready solution to this market failure—if it included payments to workers as well as to shareholders.

Yet somehow the idea of paying an exit subsidy to defense contractors has been branded as a form of corporate welfare. The real welfare, however, is the continuation of production contracts, which are much more expensive than an exit subsidy in the long run. Production requires the purchase of material inputs and reimbursement payments for the high overhead cost of substantial overcapacity. If contractors were induced not to lobby—that is, if the government offered contractors an exit subsidy to compensate them for their stranded sunk costs—then the vital parts of the defense industrial base could be preserved at a more reasonable level of expenditure.<sup>118</sup> The Pentagon has even gained some relevant experience in assessing the value of stranded physical assets through the Base Realignment and Closure process.<sup>119</sup>

Expanding the merger policy to account for the stranded human capital investment of defense industry workers is politically vital. The current congressional response to workers' lobbying protects them without reducing defense industry overcapacity. Why not take care of workers *and* solve the capacity overhang by expanding the exit subsidy instead of cutting it back? Congressional opposition to defense industry rationalization derives from legislators' fears that unemployed and uncompensated workers tend to vote against incumbents. The short-term unemployment could be made more palatable, for workers and indirectly for legislators, through the payment of adequate compensation.

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118. For a similar discussion of sunk costs and lobbying in the context of utilities deregulation, see James Q. Wilson, "Don't Short-Circuit Utilities' Claims," *Wall Street Journal*, August 23, 1995, p. A12.

119. For a careful assessment of the BRAC process's limited success, see Kenneth R. Mayer, "The Limits of Delegation: The Rise and Fall of BRAC," *Regulation*, Vol. 22, No. 3 (Fall 1999), pp. 32–38.

Fortunately, payments to workers are unlikely to prove too expensive. The government already offers voluntary separation bonuses to both military personnel and civilian DoD workers, and the necessary payments have not proven too large.<sup>120</sup> Private firms' similar plans to avoid mass firings have also been affordable.<sup>121</sup> Granted, the private-sector workers who accept buyouts are those who require the least marginal payment to move on, while the payments to defense industry employees will have to be sufficient to change the lobbying incentives of a majority of the existing employees. Therefore the defense exit subsidy bill may be slightly higher than that paid in the recent nondefense experience. But even if workers from plants closed by the proposed merger policy demand their full salaries for a long time—a true worst-case scenario, considering that most defense industry workers have good alternative job prospects<sup>122</sup>—savings would accrue to the defense budget because of reductions in materials, manufacturing, and overhead costs.

Each of the services' procurement budgets could benefit from the exit subsidy plan, but the Army's tracked combat vehicle production is a clear case that emphasizes the plan's potential. The Army has thus far avoided the expensive trap of reequipping its entire tank force or committing to a new tank development megaproject.<sup>123</sup> Instead, the Army is pursuing the gradual upgrade of its tank fleet—converting one brigade of each heavy division to the most advanced M1A2-SEP variety while upgrading the bulk of the force only

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120. Paul Stone, "Civilian Personnel Downsizing Painful, Successful," *American Forces Information Service*, August 17, 1999; Suzanne Chapman, "Civilian Drawdown Hard and Fast," *Air Force Magazine* (January 1996), pp. 28–31; and Stephen Barr, "Government Trims Downsizing Tool," *Washington Post*, December 30, 1997, p. 11.

121. Nynex is reported to have paid (at the high end of severance bonus requirements) \$119,000 per worker. Leslie Cauley, "Technology: Nynex, Bowing to Union, Slates Charge of \$1.3 Billion for Severance Sweetener," *Wall Street Journal*, March 25, 1994, p. B2. More than 14,000 New York City employees left the payroll for just over \$14,000 each in incentives. Vivian S. Toy, "For \$125 Million in Case City Cedes Budget Control," *New York Times*, March 30, 1996, p. 27.

122. Polly Lane, "Laid-Off Boeing Workers in Demand," *Seattle Times*, October 13, 1998; and Andrew Backover, "1998 Labor Reductions May Be Worst in Decade," *Fort Worth Star-Telegram*, December 8, 1998.

123. The Army has not pursued the upgrade strategy across the board. In fact, the incredible development expense of the Boeing-Sikorsky Comanche scout helicopter has been a key source of the pressure that has required the Tank and Automotive Command to implement a lower-cost procurement plan. Frank Wolfe, "Army, Marine Nominees Lay Out Modernization Shortfalls," *Defense Daily*, June 10, 1999, p. 3. At the same time, the Army is maintaining its helicopter industrial base (widely dispersed, with four production lines, each with excess capacity, currently supplying U.S. forces) with upgrade work on Sikorsky's UH-60 Blackhawk utility helicopters, on Textron-Bell's OH-58D Kiowa Warrior scout helicopters, and on Boeing-Hughes's AH-64D Apache Longbow attack helicopters.

to the lower-cost M1A1-D digitized model.<sup>124</sup> Those upgrades, however, are being produced under notably inefficient plant conditions: they could fit into a single plant with all of the other armored vehicles work, but congressional politics have blocked the facilities' rationalization. General Dynamics Land Systems' 1997 attempt to buy United Defense Limited Partnership—explicitly to consolidate the two big plants at Lima, Ohio, and York, Pennsylvania—fell through because of the objections of Pennsylvania Senators Arlen Specter and Rick Santorum.<sup>125</sup> Worried that any efficiency gains would come at the expense of Pennsylvania employment, Specter and Santorum helped arrange UDLP's sale to a Wall Street buyout firm, the Carlyle Group, which promised to leave all production in place.<sup>126</sup> As a result, the armored vehicle industrial base remains plagued by inefficient excess capacity.

#### RECOGNIZE PRIVATE ARSENALS

The federal government should build the equivalent of a public arsenal system even while defense firms remain privately owned. Instead of forcing the system to develop big projects, the defense budget should arrange for technological experimentation that is financially worthwhile for private firms. Continuous reoutfitting of the entire U.S. military is unnecessary; continuous research and prototyping are desirable. Upgrades of existing platforms may sometimes be required to adapt them to new missions or to respond to adversaries' increased capabilities. Such limited production runs could also help to preserve manufacturing and systems integration skills. Long production runs, however, should not be required to keep design teams' skills current, defense firms solvent, and weapons blueprints suitable for the assembly line.

The Pentagon's established acquisition policies reward long production runs. Historically, private contractors have earned profits only on the production phase of the defense business.<sup>127</sup> Contractors have never made much money

124. The other services have been less willing than the Army to use upgrades rather than new production of equipment. The Air Force, for example, has a great deal of unexploited flexibility in upgrading the avionics and munitions on existing fighter platforms rather than developing new platforms like the F-22 and the Joint Strike Fighter. See, for example, Bill Sweetman, "Protecting the International F-16 Fleet," *Journal of Electronic Defense*, June 1, 1999, pp. 37ff.

125. John Mintz, "Area Firms in Bidding War for Army Vehicle's Maker," *Washington Post*, August 14, 1997, p. E1; and Philip Finnegan, "Antitrust Issue Poses FMC with Dilemma on Unit Sale," *Defense News*, August 18–24, 1997, p. 11.

126. Andy Pasztor, "Carlyle Beats Out Dynamics for United Defense," *Wall Street Journal*, August 27, 1997, p. A3; and Kenneth N. Gilpin, "Military Contractor Sold to Buyout Firm," *New York Times*, August 27, 1997, p. D2. Carlyle actually paid less for UDLP than GDLS had offered.

127. Thomas L. McNaugher, *New Weapons, Old Politics: America's Military Procurement Muddle* (Washington, D.C.: Brookings, 1989), pp. 155–157.

on R&D, and they sometimes have lost a great deal—for example, during the 1980s’ binge of fixed-price development contracts.<sup>128</sup> Yet even losing money on R&D in the 1980s did not hurt most firms, because they earned compensating profits in the production boom.<sup>129</sup>

A new institutional design, appropriate for a post–Cold War “private arsenal system,” would award R&D contracts with fair rates of return. The total value of the research contracts, which would preserve design capabilities and hence the majority of the so-called option value of the existing defense industry, would amount to a far smaller burden on the federal budget than the current production-based system. Like the public arsenals in the pre–Cold War era, defense firms should be placed “on retainer”—paid for their time, monitored by auditors and technically skilled, nonprofit systems integrators (like the Federally Funded Research and Development Centers), and divorced from major production contracts.

All of the services could benefit from contracting arrangements more suitable for the post–Cold War private arsenals, but perhaps the clearest example comes from the Navy’s shipbuilding plans. The Navy has announced that it intends to allocate production of its new land-attack destroyer, the DD-21, to both Bath Ironworks and Ingalls Shipbuilding—explicitly to preserve the two design teams.<sup>130</sup> The Navy initially received only one proposal for the DD-21 contract, from a team linking Bath, Ingalls, and Lockheed Martin (as the system integrator). The Navy rejected that contract for its failure to preserve design competition. The contractors later agreed to a “shipbuilder alliance” that will maintain two competing design groups—Ingalls-Raytheon vs. Bath-Lockheed Martin—on condition that both teams are guaranteed to receive production contracts.<sup>131</sup> A similar compromise has been reached to allocate submarine production contracts to both Electric Boat and Newport News, increasing the cost of preserving design competition in that part of the Navy, too.<sup>132</sup> In each

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128. Karen W. Tyson, J. Richard Nelson, Neang I. Om, and Paul R. Palmer, *Acquiring Major Systems: Cost and Schedule Trends and Acquisition Initiative Effectiveness* (Alexandria, Va.: Institute for Defense Analysis, March 1989).

129. Ellen M. Pint and Rachel Schmidt, *Financial Condition of U.S. Military Aircraft Prime Contractors* (Santa Monica, Calif.: RAND Project Air Force, 1994).

130. Vago Muradian, “Gansler: New Techniques Needed for Consolidation,” *Defense Daily*, April 19, 1999. Production contracts for the current destroyer type, the DDG-51 Arleigh Burke, are already allocated to preserve employment at the two yards in response to political pressure from Mississippi Senator Trent Lott and others. Thomas E. Ricks, “Naval Battle: Awarding of Contracts Irks Senate’s Lott,” *Wall Street Journal*, April 21, 1997, p. A24.

131. “Surface Revolution—DD21 Redefines the Destroyer,” *Jane’s Navy International*, July 1, 1998, pp. 12ff.

132. Freedberg, “Competition Dry-Docked,” p. 1886. In the submarine agreement, the shipyards will cooperate rather than compete in the design phase as well as the production phase.

case, if the Navy's real goal is to support private design capability, it should formulate a contract to target that capability directly without spending vast additional sums for dual-sourced production and overhead.

#### ENCOURAGE COMPETITION AMONG BUYERS

The third step in reforming post-Cold War military-defense industry relations is to focus on buyers' influence rather than sellers' competition in antitrust evaluations of the defense industry. Lobbyists have recently found a new ally, antitrust regulators, in their efforts to keep defense plants open.<sup>133</sup> The regulators have discouraged further merger activity, and they have often required postmerger successor companies to spin off rather than consolidate related production lines.<sup>134</sup> Jacques Gansler, now the undersecretary of defense for acquisition and technology, has been a particularly strong advocate of maintaining at least two "competitors" in each segment of the defense industry.<sup>135</sup>

Maintaining excess capacity to preserve second sources for weapons systems has real costs. Excess capacity drives up overhead rates.<sup>136</sup> Moreover, it increases pressure on the government to buy more new weapons than it otherwise would, because each plant needs to stay busy.<sup>137</sup> Politicians feel that they ought to get some visible return—more weapons for the armed forces—in exchange for their sunk investment in the second plant capacity.<sup>138</sup> To realize that return, production runs need to be longer, which requires an increase in the procurement budget.<sup>139</sup>

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133. See David A. Fulghum, "Defense Planners Wary of Mergers," *Aviation Week*, September 29, 1997, p. 31; and "Gansler Suggests Merger Mania Needs a Breather," *Defense Daily*, October 2, 1997, p. 2. Contrast with Anthony L. Velocci, Jr., "Innovation Least in Danger as U.S. Majors Consolidate," *Aviation Week*, December 22/29, 1997, p. 99.

134. Jon G. Auerbach and John R. Wilke, "Raytheon's Hughes Acquisition Gets Conditional U.S. Approval," *Wall Street Journal*, October 3, 1997, p. B4.

135. Muradian, "Gansler: New Techniques."

136. Gansler and the other antitrust hawks of course recognize these costs, but they (mistakenly) believe that they are insignificant compared to the benefits of competition.

137. The Navy's need to allocate rather than compete shipbuilding contracts to keep its second-source shipyards open has been particularly apparent. "Shipbuilding Plan Leads to 182-Ship Navy," *Navy News & Undersea Technology*, September 30, 1996.

138. William B. Burnett and William E. Kovacic, "Reform of the United States Weapons Acquisition Policy: Competition, Teaming Agreements, and Dual-Sourcing," *Yale Journal on Regulation*, Vol. 6, No. 2 (Summer 1989), pp. 249–317.

139. For a formal model that clarifies the role of precommitment to excess capacity in increasing Congress's preferred level of weapons production, see William P. Rogerson, "Incentives, the Budgetary Process, and Inefficiently Low Production Rates in Defence Procurement," *Defence Economics*, Vol. 3, No. 1 (December 1991), p. 10.

For military procurement, the cost of pro-competitive excess capacity is unlikely to be worth paying. In a normal market, competition is vital to counteract suppliers' natural desire (and ability, in a monopoly situation) to raise prices and extract rents from consumers—in this case, the military services. But defense is not a normal market. The current political imperative to keep production lines in operation means that prime contractors face little or no competition no matter how many firms and plants remain in the defense sector. Any supply-side competition is a weak source of price-reducing pressure.

Even without the post-Cold War political dynamics, effective price competition is extremely difficult to achieve in contracting for major weapon systems. Contractors can and often do “buy in” with low bids on one-of-a-kind projects, because the government will be forced to increase the price later to obtain vital national security equipment.<sup>140</sup> The complexity of government and industry roles makes it extremely difficult to assess responsibility for delays or cost overruns. A better way to counteract the buy-in incentive would be to commit not to fund a major reoutfitting of the entire force structure with each new weapons platform. Such a commitment could be made politically credible by the exit subsidy strategy to eliminate production overcapacity. For each individual contract, then, the most reasonable approach would be to recognize that buyer-seller relationships on weapon procurements are at best a negotiated, collaborative, heavily regulated process.<sup>141</sup>

Moreover, regulations provide mechanisms other than supply-side competition through which the government can prevent sole source costs on major procurements from rising to unreasonable levels. The U.S. government is a monopsonist or near monopsonist for every major weapon platform, and it has an extensive and reasonably effective contractor auditing system, which it can use to monitor and limit cost escalation.<sup>142</sup> Of course, those oversight capabilities impose some “bureaucratic” overhead on the contractors, such that their manufacturing efficiency is not optimized in the same way that it would be if they served commercial clients. But during the Cold War, one of the core competencies developed by the defense contractors was their ability to deal relatively efficiently with government oversight, when that relationship was

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140. Jacques S. Gansler, *Affording Defense* (Cambridge, Mass.: MIT Press, 1989), p. 163.

141. For a related model, see Jim Leitzel, “Competition in Procurement,” *Policy Sciences*, Vol. 25, No. 1 (February 1992), pp. 45–46.

142. Robert Perry, “American Styles of Military R&D,” in Franklin Long and Judith Reppy, eds., *The Genesis of New Weapons* (New York: Pergamon, 1980).

not poisoned by the overzealous regulation of the 1980s.<sup>143</sup> When the normal level of that bureaucratic overhead is accounted for, it surely amounts to a smaller burden on the defense budget than the excess capacity and production supported by dual-sourcing requirements.<sup>144</sup>

All of the services' procurement budgets could benefit from a relaxation of the stress on supply-side competition, but the Air Force situation is probably the most extreme. Not all of the eight active aircraft production lines make directly comparable aircraft types at present, but the residual production capacity is enormous.<sup>145</sup> The United States certainly does not need to block consolidation because of a potential shortage of competitive airframe capacity, yet the grounds for rejecting the Lockheed Martin–Northrop Grumman merger included preserving airframe competition.<sup>146</sup> That policy is expensive: Northrop's B-2 line has been paid simply to "keep warm" for the past several years.<sup>147</sup> Since the antitrust action, pressure has increased to use the allocation of contracts to protect the government ward, Northrop Grumman's production capabilities.<sup>148</sup>

The other widely cited advantage of supply-side competition is its stimulus to innovation. The empirical record suggests that this benefit, too, is exaggerated. The prospect of competition among suppliers on production contracts

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143. William E. Kovacic, "Regulatory Controls as Barriers to Entry in Government Procurement," *Policy Sciences*, Vol. 25, No. 1 (February 1992), pp. 29–42.

144. Kenneth R. Mayer and Anne M. Khademian, "Bringing Politics Back In: Defense Policy and the Theoretical Study of Institutions and Processes," *Public Administration Review*, Vol. 56, No. 2 (March/April 1996), pp. 186–187.

145. Aircraft plants are not interchangeable, but production lines specializing in particular aircraft types can be shifted to make other types, providing some supply-side competition. For example, General Dynamics' Fort Worth plant (now owned by Lockheed Martin) was for many years a large bomber plant, producing the B-36 and B-58, before it converted to fighter production for the F-111 and then the F-16.

146. Fear of the effects of vertical integration between Lockheed Martin's airframe capabilities and Northrop Grumman's avionics capabilities also influenced the antitrust regulators. Tim Smart, "U.S. Details Claims about Lockheed Northrop," *Washington Post*, April 15, 1998, p. C9; Frederic M. Biddle, Jeff Cole, and Thomas E. Ricks, "Lockheed's Asset Sales May Fall Short," *Wall Street Journal*, March 11, 1998; and Tim Smart, "Justice Department Resisting Lockheed-Northrop Deal," *Washington Post*, March 10, 1998, p. A1.

147. The line has also engaged in some upgrade work on B-2s. Michael D. Towle, "B-2 Eluding Cost Cutters as Well as It Does Radar," *Philadelphia Inquirer*, June 23, 1997, p. 4. Note that the emphasis on keeping production capacity warm is the opposite of a program to preserve design capability.

148. "Government Now Seen Obligated to Help Northrop Grumman," *Aerospace Daily*, July 20, 1998, p. 98A. If the B-2 line is cut, despite the antitrust ruling and the post-Kosovo pressures to expand the bomber force, it will be the very first post-Cold War production line termination. Even in that case, Northrop Grumman's plant may survive as the site of a follow-on bomber program. David Atkinson, "B-2s Demonstrated Combat Efficiency over Kosovo," *Defense Daily*, July 1, 1999, p. 1.

may lower defense firms' incentives to make aggressive up-front investments in R&D; such aggressive approaches are required for major weapon system innovations.<sup>149</sup> But more important, the main source of innovation in the defense sector is on the demand side.<sup>150</sup> In the strategic bomber program, for example, the Air Force established highly optimistic performance goals for its weapons development programs, which contractors frequently failed to achieve. But even in those failures, the contractors created highly innovative, top-quality aircraft.<sup>151</sup> Pressure to set those high performance goals was spurred by interservice rivalry over roles and missions: for example, all of the services sought control over the strategic nuclear forces, so all experimented with various delivery systems; the result was the rapid development of a reliable, secure nuclear deterrent.<sup>152</sup> Similar demand-side competition helped the development of tactical aircraft, and intraservice competition in the Navy (between the surface, submarine, and aviation components of the fleet) led to innovative solutions for antisubmarine warfare.<sup>153</sup>

The principal threat to the demand-side innovative stimulus has come from jointness—the sharing of weapons platforms among multiple services. Joint determination of requirements amounts to collusion among the military buyers rather than among the defense contractor sellers. With each service made secure in its role and budget share by jointness, none has much incentive to experiment with new approaches, which risk politically embarrassing performance failures.<sup>154</sup> If only a Joint Project Office buys fighter aircraft, then its whims govern the so-called market. The suppliers left in the defense market understand the mantra “know thy customer,” and they will all design essentially identical products if their sole customer announces a single specification. With monopsony, the effects of supplier competition are highly attenuated. Competition among the services, to the extent that it is tolerated, is the stimu-

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149. William P. Rogerson, “Profit Regulation of Defense Contractors and Prizes for Innovation,” *Journal of Political Economy*, Vol. 97, No. 6 (December 1989), p. 1292.

150. Keith Hartley, “Defence Markets,” *Economic Affairs*, Vol. 17, No. 4 (December 1997), pp. 22–27.

151. Brown, *Flying Blind*, pp. 312–313.

152. Owen R. Coté, Jr., *The Politics of Innovative Military Doctrine: The U.S. Navy and Fleet Ballistic Missiles*, Ph.D. dissertation, Massachusetts Institute of Technology, 1995.

153. On tactical aircraft, see Marshall L. Michel, III, *Clashes: Air Combat over North Vietnam, 1965–1972* (Annapolis, Md.: Naval Institute Press, 1997); and Richard P. Hallion, “A Troubling Past: Air Force Fighter Acquisition since 1945,” *Airpower Journal*, Vol. 4, No. 4 (March 1990), pp. 4–23. On antisubmarine warfare, see Harvey M. Sapolsky and Owen R. Coté, Jr., “The Third Battle of the Atlantic,” *Submarine Review* (July 1997), pp. 40–42.

154. The jointness problem is, of course, compounded by the pork barrel political incentives attached to a low level of perceived strategic threat.

lus for innovation in defense—not the number of suppliers seeking the services' favor.<sup>155</sup>

### *Conclusion*

The Cold War is over. U.S. defense budgets are being absorbed in producing wasteful political benefits. Despite the appearance of a post-Cold War draw-down—and even a so-called procurement holiday—political pressures keep government expenditure on the defense industry at Cold War levels. The services have the responsibility, if not the clear authority, to shape a reasonable defense industrial policy. An inclusive, pro-consolidation merger policy would enable political support for the elimination of defense industry overcapacity. Once the overcapacity is wrung out of the defense industrial base, a new business-government relationship would be able to preserve needed research and design skills at lower cost. The time has come to begin the serious planning for an uncertain future.

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155. Harvey M. Sapolsky, "Interservice Competition: The Solution, Not the Problem," *Joint Forces Quarterly*, No. 15 (Spring 1997), pp. 50–54; and Sapolsky and Eugene Gholz, "How About an Anti-Trust Probe of the Pentagon?" *Wall Street Journal*, May 21, 1998, p. A16.