

150-180 billion dollars a year (in 1988 dollars). These reductions in production will likely then more or less match the already-evident reduction in the global arms trade.

The most interesting medium-term developments, however, are not captured by overall statistics on arms production and transfers. Three of them are of special importance:

- the changed rate of technological innovation;
- the changing relationship between civilian and military technologies;
- specialization in the arms export market, and the emergence of "internationalized" forms of arms production.

The changing pace of technological innovation is captured best through the amount of resources devoted to military R&D. All things being equal, if the unit cost of weapons increases faster than procurement budgets, or if the resources devoted to military R&D decline, then the pace of innovation will slow. Worldwide annual military R&D spending in the mid-1980s was between 110 and 130 billion U.S. dollars, or about 10-15 percent of global military spending. But although military spending has slowly started to decline in real terms since the end of the Cold War (roughly 25 percent since 1989, mostly in 1992 and 1993), R&D budgets have been relatively insulated from these cuts.²⁴ And although procurement budgets have in most countries been slashed dramatically (to ten percent of 1990 levels in the case of Russia!), the share of R&D in total military spending has actually increased in many states. This suggests that most advanced arms producers are at least attempting to maintain their place in the global military hierarchy. At the same time, however, the unit cost of weapons has continued to increase relentlessly, with one estimate placing it at about five percent per year in real terms.²⁵ The price tag on the American B-2 bomber, for example, has now reached \$750 million, and only 20 will be procured.²⁶ Hence even if R&D budgets remain constant, the rate of innovation will be slowed, or will increasingly be concentrated in the "first tier" - the United States - or will shift to new centres such as Japan.

²⁴ The most recent figures for U.S. R&D spending (1992) show no decline in current dollar terms from previous levels; French and British spending fell modestly, and the Russian situation was impossible to interpret with certainty. SIPRI, *1993 Yearbook*, 346, 374.

²⁵ Jacques Gansler, *The Defense Industry* (Cambridge, Mass.: MIT Press, 1980), 83. This rate of increase doubles the cost of a weapons system in 13 years. See also Norman Augustine and Kenneth Adelman, *The Defense Revolution* (San Francisco: Institute for Contemporary Studies, 1990), which places the doubling time at ten years.

²⁶ The original order was for 132 planes at \$500 million each. Some reports put the per-plane cost at more than \$2 billion. See Joseph Romm, "Laid Waste by Weapons Lust," *Bulletin of the Atomic Scientists*, 48:8 (1992), 15-23.