n late 1958, a startup company called Fairchild Semiconductor in Palo Alto, Calif., had a serious problem. It had contracted to produce transistors for the Minuteman missile program, which required transistors that were hundreds of times more reliable than the state of the art. But Fairchild’s devices were randomly failing. Testing revealed a force as gentle as a pencil tap could dislodge specks of metal that would cause an electrical short. The frantic efforts of Fairchild’s engineers to solve the problem led to an invention early the next year: the planar process, the first commercially practical process for making integrated circuits.

Thus, although the integrated circuit wasn’t the product of a federal research lab or a research grant, the federal government indirectly had a hand in it through its procurement spending. The electronics technologies Fairchild created as a subcontractor for the missile program became the foundation of the semiconductor chips that are ubiquitous today.

The case isn’t an isolated one: Economic research has indicated that public procurement spending can induce research and development spending and stimulate innovation — adding to research and development, not just redirecting activity that would have taken place anyway. For example, a 2012 paper by economist Mirko Draca, now of the University of Warwick, found that the procurement spending of the Reagan administration’s military buildup significantly boosted both patenting (which is often used as a measure of innovation) and research and development activity.

But what kind of public procurement has the greatest effect on research and development? Intuition — and history — might suggest that the answer is spending on high-technology goods and services. A recent article in *American Economic Journal: Macroeconomics* by two German economists, Viktor Slavtchev of the Halle Institute for Economic Research and Simon Wiederhold of the Ifo Institute, finds empirical support for this idea.

Slavtchev and Wiederhold find that company-funded research and development has a positive and statistically significant relationship with the technology intensity of federal procurement. In particular, the researchers estimate that “each dollar that the government takes away from low-tech industries to spend it in high-tech industries relates to an increase in private R&D of about 21¢.”

On the basis of further analysis, they conclude that the relationship is causal: Shifts between low-tech and high-tech in the government’s shopping basket brought about the changes in research and development spending.

The authors acknowledge, however, that it is unclear whether a strategy of increasing private research and development through high-tech public procurement would be more efficient than other policies, such as direct subsidies or favorable tax treatment. Moreover, they note that to the extent the government skews its spending in favor of high-tech products and services for the sake of stimulating research and development, rather than looking only at its own needs in deciding what to buy, the government’s cost-efficiency in providing public services would be hurt. In addition, they point out that there is a question of which industries such a strategy should target — and the government has a mixed record in picking winners. Consequently, they indicate, federal spending as a tool for promoting innovation could push research and development resources in the wrong direction.

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“Does the Technological Content of Government Demand Matter for Private R&D? Evidence from U.S. States.”