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CUT TO INVEST

Create a 'Race to the Shop' Competition for Advanced Manufacturing

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Summary

A "Race to the Shop" competition for advanced manufacturing should be initiated in order to expedite the transition toward a more innovative, productive, inclusive, and globally competitive American economy. The competition would challenge U.S. states and metropolitan areas to align their policies and investments to meet the distinct labor demands of their primary advanced manufacturing sectors and clusters. Winning applicants would not only receive resources for planning and implementation, but also increased flexibility in the use of existing federal workforce development and skills training funds.

Background

In the years preceding the Great Recession, the United States pursued a post-industrial economic growth model, prioritizing consumption and real estate speculation over investments in innovation and production—the true engines of economic competitiveness and wealth generation in America. Among the few positive developments drawn from the Great Recession is that the U.S. economy is now undergoing a slow, painful transition toward a "next economy," one where the U.S. exports more and wastes less, innovates in what matters, produces more of what it invents, and ensures that the economy actually works for working families.

Reviving America's advanced manufacturing sector is obviously a critical component of building a more productive, sustainable, and inclusive economy. U.S. manufacturing is an important source of quality well-paying jobs that offer a significant wage premium—nearly 20 percent higher average weekly earnings than non-manufacturing jobs—and are more likely to provide health care and retirement benefits. The sector also accounts for the lion's share of the country's R&D and innovation activity. While manufacturing provides only 9 percent of all U.S. jobs and 11 percent of total GDP, it employs 35 percent of all engineers, represents 68 percent of the spending on R&D that is performed by U.S. companies, and produces 90 percent of all patents developed in the United States. Further, manufactured goods comprise about 65 percent of all U.S. trade (both imports and exports), according to Helper, Krueger, and Wial, making it a crucial component of any strategy to reduce America's growing trade deficit. In short, a strong manufacturing sector is necessary for America to compete in the global economy.

America's strengths in advanced manufacturing are not uniform, but vary considerably by geographic location in states and metropolitan areas across the country. States such as Michigan and Ohio, for example, are highly specialized in motor vehicle and parts manufacturing because of the industry

strengths of their "auto belt" metros such as Detroit, Lansing, Flint, Toledo, and Youngstown. Other states such as California and Oregon are home to a large share of the nation's computer and electronics manufacturing due to the major clusters in metros such as San Jose and Portland. In total, the nation's 366 metropolitan areas concentrate a supermajority—79.5 percent in 2010—of all manufacturing jobs, with nearly all having at least one type of manufacturing industry specialization.

The diversity of dominant manufacturing industry clusters in states and metropolitan areas throughout the country means that different regions have different needs for research and development (R&D), labor, education, and workforce skills based on the demands of their largest sectors. Therefore, effective manufacturing policy, particularly at the federal level, cannot be a "one size fits all" approach that uniformly distributes money for programs that are not tailored—and thus not always relevant—to the skill and research requirements of many state or regional markets. Rather, investments in manufacturing must be more differentiated and flexible to serve disparate state and local strategies in regions as diverse as Toledo and Portland.

President Obama's Advanced Manufacturing Partnership (AMP) recently distilled the federal policy responsibilities into three primary categories: (1) enabling innovation, (2) securing the talent pipeline, and (3) improving the business climate. Despite the AMP's focus on the federal government, governments at all levels in America's federalist system have important and complementary roles to play.

The federal government is obviously critical to spurring advanced manufacturing in the United States because it sets the policy platform for growth in states and metropolitan areas. The federal government enables innovation by making smart investments in public goods such as advanced manufacturing R&D and infrastructure, as well as through strategic tax incentives such as the accelerated depreciation of machinery and equipment and the R&E tax credit. It is vital to securing the talent pipeline by investing in K-12 education, community colleges, and higher education, and in policies like the H-1B visa program that facilitates the hiring of skilled immigrant workers. Finally, the federal government is responsible for maintaining a strong business climate in the United States through sensible trade, tax, and energy policies and regulations.

While the federal government's role is essential, actions at the state and metropolitan levels also matter significantly to advanced manufacturing. Like Washington, states and metros are investors in R&D, infrastructure, and education. Their institutions—public universities, community colleges, secondary schools—conduct basic research, commercialize promising innovations, and educate the next generation's workforce. Both states and metros are also key players in promoting exports abroad and attracting foreign direct investment back home. Further, cities and municipalities control land use and zoning, which are critical to the siting and expansion of manufacturing facilities. Finally, states and metros are vital to advanced manufacturing because they align disparate funding sources, economic development strategies and transactions, and formal and informal initiatives from various levels of government into targeted support for their distinctive industry clusters. Any effective federal manufacturing initiative, therefore, must engage and align with state and metro strategies.

In the wake of the Great Recession, America is once again realizing that a robust manufacturing sector is essential to the long-term health and prosperity of the U.S. economy. At all levels of government, there are new policies and programs to boost advanced manufacturing.

At the federal level, the Obama administration has advanced several important manufacturing initiatives, particularly in the area of applied research. One of the most promising proposals is the $1 billion National Network for Manufacturing Innovation (NNMI) initiative that is aimed at catalyzing regional manufacturing innovation ecosystems. In August 2012, the administration announced a pilot public-private manufacturing research institute in Youngstown, Ohio—the National Additive Manufacturing Innovation Institute (NAMII)—which will focus on the emerging 3D printing technology. The federal government awarded $30 million in funds, to be matched by $40 million from a consortium

of 60 companies, universities, community colleges, and non-profit organizations throughout the Youngstown region. The Obama Administration's ultimate goal is to create a national network of 15 such regionally-focused manufacturing research centers.

In addition to the federal government, several states and metros are devising their own manufacturing strategies that build on their distinctive strengths and sectors. In Colorado, the state government and other public and private stakeholders are developing a strategy to strengthen the state's burgeoning aerospace industry cluster. Like Colorado, the state of Tennessee is outlining a plan for enhancing its footprint in the automobile manufacturing industry. In Massachusetts, Governor Deval Patrick recently created the Advanced Manufacturing Collaborative, a task force of business, government, and academic leaders that is charged with increasing the competitiveness of the state's manufacturing industries by focusing on improving and investing in areas such as workforce and education programs, innovation, business costs, and access to capital.

At the metro level, public and private sector leaders from Northeast Ohio's metros—Akron, Cleveland, and Youngstown—are implementing a regional business plan that helps small and medium-sized manufacturing firms retool their facilities and retrain their industrial workers for sectors poised for growth, including fuel cells, electric vehicles, and medical devices. Other metros, such as Newark and Louisville/Lexington, are also in the process of creating advanced manufacturing plans that build on their strongest industries and clusters.

The common thread across all levels of government is a concerted focus on strategies that help firms and supportive institutions jointly innovate on products and processes as well as purposefully engage on skills training. Inspiration for these strategies comes from proven models in manufacturing-oriented countries like Germany (e.g., Fraunhofer Institutes) as well as from best-in-class U.S. engineering and technology organizations (e.g., Edison Welding Institute in Columbus, Ohio).

The Problem

While there has been a resurgence of manufacturing activity post-recession and a renewed interest in using public policy to spur manufacturing competitiveness, the United States still lacks a coherent, overarching manufacturing strategy. Among the challenges are:

- The federal government does not have a unified inventory of spending programs, capital access initiatives, and tax expenditures that support manufacturing. A recent Congressional Research Service report noted: "there appears to be no comprehensive, reliable estimate of the amount the federal government is spending on programs that support the manufacturing sector"

- The federal government's investments related to manufacturing do not reside within a single department, but rather span multiple agencies and programs. The agencies involved include the Department of Commerce, the Department of Defense, the Department of Education, the Department of Energy, the Department of Labor, the National Aeronautics and Space Administration (NASA), the National Science Foundation (NSF), and the Small Business Administration, among others

- The federal government under-invests in programs that directly aid manufacturing. Researchers at the Massachusetts Institute of Technology estimate that the federal government spends only about $800 million on manufacturing programs (not including R&D) at the four primary agencies responsible for manufacturing support—the Department of Defense, the Department of Energy,

the Department of Commerce's National Institute of Standards and Technology (NIST), and the National Science Foundation

In addition to lacking a strong manufacturing policy generally, the federal government's workforce development and skills training programs do not adequately address the growing demand for skilled production workers.

- The bulk of federal dollars spent on elementary, secondary, and postsecondary education are intended to support the general goal of a four-year degree, providing woefully inadequate incentives and resources for educational institutions to address the education and skills needs of advanced manufacturing

- The federal government—like most state governments—has de-emphasized the importance of vocational education in recent decades. A recent survey of U.S. manufacturing firms by Deloitte and the Manufacturing Institute noted that "the national education curriculum is not producing workers with basic skills they need—a trend not likely to improve in the near term"

- Federal spending on workforce development and career and technical education (CTE), through programs like the Workforce Investment Act (WIA) and the Perkins Act, is too narrow, prescriptive, and inflexible to meet the needs of states and metropolitan areas. In FY 2011 and FY 2012, the percentage of WIA funds that governors were able to "set aside" for discretionary state and local workforce training and employment programs was reduced from 15 percent to 5 percent. Although Congress restored the 15-percent level in the FY 2013 appropriations bill, the long-term future is unclear as WIA has not been reauthorized to date. Similarly, the Perkins Act does not, among other things, "require states to systemically identify the economic needs and priorities of the state, regional, or local economies when making decisions on which CTE programs should be funded using Perkins dollars," according to a Department of Education publication

- The legislation for the Perkins Act, which currently provides over $1.1 billion per year in federal funding for career and technical education, will expire in 2013 without reauthorization. This funding level represents less than 2 percent of the Department of Education's total discretionary budget authority. At a minimum, maintaining the level of funding for the Perkins Act is critical given that the average age of a high-skilled production worker in the United States is 56 years old. The gap between high-skilled manufacturing job openings (e.g., machinists, technicians, etc.) and workers with skills necessary to fill them is projected to rise from between 80,000 and 100,000 today to 875,000 by 2020, according to the Boston Consulting Group

- Federal investments in science, technology, engineering, and mathematics (STEM) education, a critical component of educating the next-generation advanced manufacturing workforce, are small and fragmented. According to a report by the National Science and Technology Council, the $3.4 billion federal investments in STEM education represent less than 1 percent of total annual spending on education in the United States The $3.4 billion that the federal government does spend on STEM education is spread across 13 federal agencies and 252 distinct federal investments

Finally, the federal government fails to catalyze states and metros to coordinate and align support for their leading manufacturing clusters and sectors.

Despite several notable exceptions, state and metropolitan policies toward manufacturing—and economic development more generally—are primarily about attracting and retaining businesses through financial incentives, instead of expanding new and existing manufacturing activity within their primary industry clusters.

Proposal

Given these challenges, the Metropolitan Policy Program at Brookings proposes **an annual $150 million Race to the Shop competition to reform and modernize federal investments in workforce education and skills training for advanced manufacturing in the United States.**

The Obama administration's Race to the Top competition in the educational arena offers a model for Race to the Shop. Race to the Top is a clear example of how the carrot of a relatively small amount of federal spending can reinvent how states (and metros) carry out a critical role of government, as states undertake systemic reforms and develop new, innovative approaches to education in hopes of qualifying for federal education grants.

A Race to the Shop competition would challenge states and metropolitan areas to develop long-term plans, investment strategies, and regulatory and administrative reforms in support of their top advanced manufacturing sectors, particularly in the area of skills training and workforce development. The competition would require a cross-section of leaders from the public, university, non-profit, and private manufacturing sector in states and metro areas to organize a task force (perhaps led at the state level by the governor's office and at the metro level by a consortium of elected officials or a leading non-profit or manufacturing intermediary) that would be charged with designing and submitting a proposal to address the manufacturing workforce and skills challenges within their state or region. The proposals would:

- Articulate a bold economic vision for the state or metro that builds on their special assets and strengths in advanced manufacturing
- Identify and prioritize key weaknesses or barriers (e.g., lack of strong vocational education or skills training system, absence of customized training for existing industrial firms and sectors, etc.) to successfully implementing the state or metro plan
- Design strategies that carry out the plan through tangible projects and investments, with deep and sustainable involvement of manufacturing companies
- Leverage other federal funds in support of these strategies
- Reform state and/or local policies and governance in support of these strategies
- Hold themselves accountable on a regular basis through a set of transparent performance measures

An interagency Race to the Shop Partnership would review submissions and annually award planning and implementation grants to the five states and five metropolitan areas with the strongest and most comprehensive plans. The $150 million annual cost of the program is based on an average grant amount of $15 million that would be distributed over three years, but the actual award total would vary depending on the size of the state or metropolitan area's industrial base. Each winning state and metro

would receive an initial tranche of funding in the first year to enable strategic planning, state and metropolitan system reform (via both legislative and administrative action), and first-stage implementation. The drawdown of award money in subsequent years would be contingent upon achieving specific milestones and reforms outlined in their initial competition proposals.

Recipients would be given increased flexibility to deploy existing federal resources (e.g., WIA or CTE funding) in the way most beneficial for building their top advanced manufacturing sectors. States and metros might, for example, use more flexible WIA and/or CTE funds to create a network of advanced manufacturing high schools or to align community college curricula to fit the skill demands of their state/regional labor markets. This competition would group together federal programs and agencies across a broad and diverse range of activities and policy areas to support these bottom-up workforce plans. In the end, it is expected that a limited amount of targeted federal funds would leverage greater public, private, and civic resources and, most importantly, prepare a new generation of workers for a renewed manufacturing sector.

The Race to the Shop Partnership would be composed of representatives from the departments of Commerce, Labor, Education, and Defense, and the National Science Foundation. Several manufacturing policy experts and manufacturing leaders from the private sector would also be selected to serve in an advisory capacity in helping to oversee the competition and review its effectiveness.

The Race to the Shop initiative would align with the existing effort to promote the use of manufacturing industry-recognized national skills certifications in the education system. The goal under Race to the Shop would be to expand this program—particularly with regard to credentials for advanced manufacturing industries—into the secondary and postsecondary curricula in a greater number of states, in order to create a national vocational education system that is better aligned with the employment requirements and standards of the advanced manufacturing industry.

As another component of the initiative, the AMP's National Program Office would increase its manufacturing policy coordination role to include a greater emphasis on aligning workforce training and vocational education programs. In addition to maintaining its current focus on improving collaboration around technology innovation across federal agencies, state and local governments, universities, and the private sector, the National Program Office would conduct an audit of all federal education and skills training programs related to manufacturing to ensure that states and metro areas are able to align federal resources to the greatest extent possible with the labor demands of their primary manufacturing clusters. The AMP's National Program Office would be responsible for working with states and metros to determine how federal funds can be more tailored to meet their disparate needs, and then, based on its findings, make recommendations to reform existing funding flows.

Implementing a Race to the Shop program along these lines would:

- **Catalyze states and metropolitan areas to develop innovative plans that help meet the labor demands of their primary manufacturing sectors and clusters**

- **Allow existing federal workforce and skills training funds to be more targeted and tailored** toward the specific funding needs of states and metros

- **Provide additional, highly flexible federal resources** to support advanced manufacturing strategies with needed gap financing

- **Modernize the federal government** to be more nimble and to better meet the diverse demands of a differentiated economy

- **Strengthen and grow** America's advanced manufacturing industries to allow for further job creation and innovation

The Race to the Shop competition differs from other existing federal competitions, such as the Trade Adjustment Assistance Community College and Career Training (TAACCCT) and the i6 Challenge programs, in that it is a challenge grant intended to give states and metros the incentive to sharpen their manufacturing efforts and leverage more substantial federal (e.g., Perkins CTE funding, WIA funding, other education funding) and private-sector resources.

Race to the Shop is also intended to supplement, not replace, important federal manufacturing programs like the longstanding Manufacturing Extension Partnership (MEP) and the Obama administration's new $1 billion NNMI initiative. The federal government has a vital role to play in providing a platform for basic research (through federal R&D flows), applied research (through initiatives like NNMI), business and technological services (through MEP), and manufacturing-oriented skills training. A Race to the Shop initiative would primarily address the manufacturing workforce challenge.

Finally, the initiative could be linked with the NNMI to allow the regional institutes included in a winning state or metro's plan to receive additional funding for their education and skills training programs from the $15 million in total grant money that is awarded to each of the 10 annual winners.

Budget Implications

The overall budget impact of implementing a Race to the Shop competition would be revenue-neutral. The $150 million in annual funding for the competition could be drawn from spending and tax expenditure cuts that are carried out as part of broader deficit reduction plans, using what we call "cut to invest" strategies. In addition, allowing states and metros greater flexibility for the use of WIA and CTE funding to address the workforce and skills needs of their primary industries and clusters would not have a budgetary impact.

State of Play

The Great Recession—and its aftermath—have created a moment of renewed focus on the importance of advanced manufacturing in the United States While the manufacturing sector has steadily added jobs most months during the past three years, there are ways in which governments at all levels of the federalist system can be more involved in strengthening America's advanced manufacturing industry. In the coming year, there will be several opportunities to make reforms to federal workforce and training programs and to re-allocate existing funds to pay for a Race to the Shop competition.

For instance, as the federal government considers reauthorization of the Workforce Investment Act and the Perkins Act, it should implement reforms to allow states and metropolitan areas greater flexibility in the use of these funds to develop or further pursue their own innovative workforce development and skills initiatives. Additionally, as the Obama Administration develops its FY 2014 budget, it should consider ways to repurpose existing federal investments in advanced manufacturing to create a dedicated funding stream for a Race to the Shop competition.

Implementation Requirements

Legislative action would be required to initiate the competition, formalize the cross-agency partnerships, and repurpose existing federal funds for awards to the states and metropolitan areas with the best strategic plans.

Legislative precedent exists for developing this type of program. There are several recent examples of cross-agency partnership and collaboration on specific initiatives. In 1994, the School-to-Work Opportunities Act was signed into law that formed a partnership between the Department of Education and the Department of Labor to provide grants for states and local communities that develop career and workforce training programs in their school curricula. A more recent example is the ongoing interagency Partnership for Sustainable Communities that brings together the Department of Housing and Urban Development, the Department of Transportation, and the Environmental Protection Agency to coordinate federal housing, transportation, and infrastructure investments in order to encourage more sustainable and spatially efficient development patterns in U.S. metropolitan areas.

References

Robert D. Atkinson and Stephen Ezell, "The Case for a National Manufacturing Strategy." Washington: Information Technology & Innovation Foundation, 2011.

Robert D. Atkinson and Luke A. Stewart, "University Research Funding: The United States is Behind and Falling." Washington: Information Technology & Innovation Foundation, 2011.

Robert D. Atkinson and Howard Wial, "Boosting Productivity, Innovation, and Growth through a National Innovation Foundation." Washington: Brookings Institution, 2008.

Boston Consulting Group, "Skills Gap in U.S. Manufacturing Is Less Pervasive Than Many Believe. " Boston: Boston Consulting Group, 2012.

Eliza Eddison, "Survey of Federal Manufacturing Efforts." Washington: Massachusetts Institute of Technology Washington Office, 2010.

Executive Office of the President of the United States, "A Framework for Revitalizing U.S. Manufacturing." Washington: The White House, 2009.

Susan Helper, Timothy Krueger, and Howard Wial, "Locating American Manufacturing: Trends in the Geography of Production." Washington: Brookings Institution, 2012.

Susan Helper, Timothy Krueger, and Howard Wial, "Why Does Manufacturing Matter? Which Manufacturing Matters? A Policy Framework." Washington: Brookings Institution, 2012.

Susan Helper and Howard Wial, "Accelerating Advanced Manufacturing with New Research Centers." Washington: Brookings Institution, 2011.

Susan Helper and Howard Wial, "Strengthening American Manufacturing: A New Federal Approach." Washington: Brookings Institution, 2010.

Bruce Katz, "Remaking Federalism to Remake the Economy." Washington: Brookings Institution, 2012.

James Manyika, Daniel Pacthod, and Michael Park, "Translating Innovation Into US Growth: An Advanced-Industries Perspective." *McKinsey Quarterly*, 2011.

Tom Morrison, Bob Maciejewski, Craig Giffi, Emily Stover DeRocco, Jennifer McNelly, and Gardner Carrick, “Boiling Point? The Skills Gap in U.S. Manufacturing.” Deloitte and the Manufacturing Institute, 2011.

National Science and Technology Council, “The Federal Science, Technology, Engineering, and Mathematics (STEM) Education Portfolio.” Washington: The White House, 2011.

Luke A. Stewart, Jacek Warda, and Robert D. Atkinson, “We’re #27!: The United States Lags Far Behind in R&D Tax Incentive Generosity.” Washington: Information Technology & Innovation Foundation, 2012.

U.S. Department of Education, “Investing in America’s Future: A Blueprint for Transforming Career and Technical Education.” Washington: U.S. Department of Education, 2012.

U.S. Government Accountability Office, “Information on Federal Programs and Interagency Efforts that Support Small Businesses Engaged in Manufacturing.” Washington: U.S. Government Accountability Office, 2007.

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Remaking Federalism | Renewing the Economy

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Acknowledgments

The Metropolitan Policy Program at Brookings would like to thank the John D. and Catherine T. MacArthur Foundation, the Heinz Endowments, the F.B. Heron Foundation, and the George Gund Foundation who provide general support for the Program's research and policy efforts. We would also like to thank the Metropolitan Leadership Council, a network of individual, corporate, and philanthropic investors that provide us financial support but, more importantly, are true intellectual and strategic partners.

The authors would also like to thank Mark Muro, David Hart, and Emily DeRocco for their substantive and thoughtful comments on earlier drafts of the paper.

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