

Joint Economic Committee | Democrats  
Senator Amy Klobuchar, Vice Chair

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# Manufacturing Jobs for the Future



# Executive Summary

U.S. manufacturing has long been an engine of innovation, a source of good jobs with high wages and solid benefits, and a major contributor to exports. The sector directly accounts for 12 percent of gross domestic product and employs more than 12 million people. Manufacturing is responsible for 70 percent of private-sector investment in research and development, employs 60 percent of research and development workers and generates 90 percent of all patents. In addition, manufacturing has the highest economic multiplier of any sector—every \$1.00 in manufactured goods is estimated to generate \$1.48 worth of additional economic activity.

After being hit hard during the recent recession, U.S. manufacturing employment has increased by 554,000 jobs since February of 2010. Exports are strengthening the recovery; the value of manufacturing exports has grown by 38 percent since 2009. More than 3 million manufacturing jobs are currently attributable to exports.

The recent growth in manufacturing is also partially due to companies bringing production back to the United States. Several factors have made locating production in the United States more attractive: productivity gains, increases in labor costs among key competitors, lower natural gas costs in the United States and the benefits of locating production and research and development in close proximity.

Despite these positive trends in manufacturing, the sector needs to add 1.7 million jobs to return to pre-recession levels. Challenges include: a skills gap for the manufacturing jobs of the future, insufficient support for research and development, obstacles to accessing and competing in overseas markets, deteriorating transportation infrastructure and an outdated and overly complex tax and regulatory system.

This report discusses policy proposals in four key areas to boost America's manufacturing sector:

- Strengthening America's 21st century workforce;
- Expanding access to capital;
- Opening markets abroad; and
- Creating the conditions necessary for growth.





## Manufacturing Jobs for the Future

U.S. manufacturing has long been an engine of innovation, a source of good jobs with high wages and solid benefits, and a major contributor to exports. The sector was hit hard during the recent economic downturn, losing 2.3 million jobs. After decades of decline, manufacturing employment has made a comeback over the past several years. Accelerating this expansion in manufacturing would strengthen the economy and help lay the groundwork for future growth.

Since February 2010, manufacturing employment in the United States has increased by 554,000 jobs. **(Figure 1)** The value of manufacturing exports has also increased significantly, growing by 38% since 2009, and productivity gains in manufacturing have outpaced productivity increases in other sectors over the course of the recovery.

The recent growth in manufacturing can be partially attributed to companies that have decided to bring production back to the United States, a result of productivity gains, a narrowing of the wage gap with competitors and an increasing recognition of the benefits of locating production domestically.

Even with the recent progress, significant challenges remain. Manufacturing employment remains well below its 1979 peak, as the decline in manufacturing employment accelerated during the 2000s. This extended decline can be attributed in part to an increase in automation in the sector, as well as to manufacturers moving production offshore.

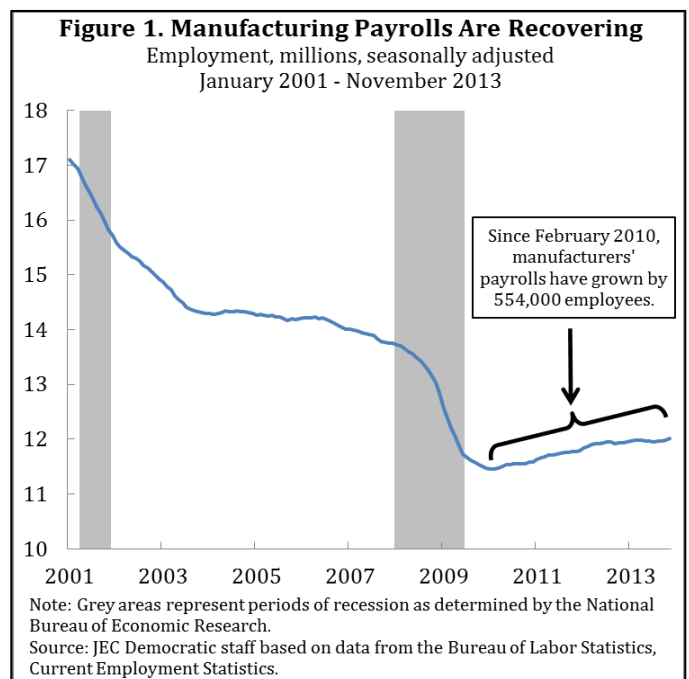
As the sector continues to shift toward advanced production methods, employers' demand for workers with science, technology, engineering and math (STEM) capabilities will increase. Policies that promote STEM education, support worker-

training programs and strengthen post-secondary opportunities will be vital to ensuring a dynamic, competitive manufacturing sector.

This study explores the importance of manufacturing and the impact that continued growth could have for the U.S. economy overall. It examines employment trends across manufacturing industries during the recession and recovery, as well as the growing role of exports. It also describes policy options to address challenges facing the sector and lay the groundwork for future gains.

### The Role of Manufacturing in the U.S. Economy

U.S. manufacturing directly accounted for 12% of gross domestic product (GDP) in 2012 and currently employs more than 12 million people.<sup>1</sup> The sector is responsible for the majority of U.S. exports, and manufacturing exports alone support



more than three million jobs across the country.<sup>2</sup> The sector also supports job growth and increased productivity in other parts of the economy.

Research shows that the employment multiplier is higher in manufacturing than in other sectors: each manufacturing job supports an additional 1.6 jobs, and each advanced manufacturing job supports as many as 4.9 other jobs.<sup>3</sup> The larger multiplier is partly explained by manufacturing supply chains and the large number of supplier jobs that depend on the sector. Manufacturing jobs support more than four times as many supplier jobs as retail trade.<sup>4</sup> In addition, every \$1.00 in manufactured goods is estimated to generate \$1.48 worth of additional economic activity—spillovers higher than in any other sector.<sup>5</sup>

Larger manufacturing spillovers are also a result of higher wages. According to the Commerce Department, the average monthly earnings of newly hired factory workers are 38% higher than those of new workers in other sectors.<sup>6</sup> Manufacturing jobs are also more likely than service-sector jobs to come with medical and retirement benefits.<sup>7</sup> When these benefits are included, on average, manufacturing jobs pay a 17% hourly premium over non-manufacturing jobs.<sup>8</sup>

Manufacturing is the most innovative sector of the economy and is vital to U.S. competitiveness. It accounts for 70% of research and development carried out by U.S. industry, employs 60% of research and development workers and generates over 90% of all patents.<sup>9</sup> More than half of the economic growth in the United States can be attributed to improved productivity resulting in part from innovation.<sup>10</sup>

Manufacturing also catalyzes productivity gains in other businesses in local communities.<sup>11</sup> One study found that a manufacturing plant moving into a community improved the productivity of nearby firms by 12% relative to similar firms in areas where a plant did not open.<sup>12</sup>

There is substantial evidence indicating there are gains to be had from locating production in close

proximity to research and development and design activity.<sup>13</sup> Collectively, the networks of suppliers, skilled labor and know-how that spring up around the nexus of design and production fuel growth.

## Manufacturing Is Experiencing a Comeback

Despite the vital role manufacturing plays in economic growth, employment in the sector was declining until recently. Manufacturing employment peaked at 19.6 million employees in June 1979, when 22% of all nonfarm workers were employed in the sector.<sup>14</sup> The decline in manufacturing employment accelerated in the 2000s, and by the start of the recession in December 2007, the sector employed only 10% of all workers—less than half the share three decades earlier.<sup>15</sup> From 1979 through the start of the recession, manufacturing employment dropped by 30%. Even if the number of manufacturing jobs had stayed the same over this period, the share of manufacturing jobs still would have dropped since overall employment grew by more than 50% over this time.<sup>16</sup>

Employment in both durable and nondurable goods manufacturing declined during the recession. (**Box 1**) However, a number of manufacturing industries have experienced a comeback in recent years. The following sections provide an overview of the changes in manufacturing employment by industry during the recession and recovery. (**Table 1** at the back of the report has a complete breakdown.)

**Recession:** From the beginning of the recession through the trough for manufacturing employment in February 2010, nearly 2.3 million manufacturing jobs were lost, and all manufacturing industries shed workers. The U.S. manufacturing sector lost

**Box 1:** Durable goods are products with an average lifespan of at least three years, including automobiles, appliances, factory machinery and computers.

Nondurable goods are products either immediately consumed in one use or with a lifespan of less than three years, including food, clothing and fuel.

(Source: Bureau of Labor Statistics)

295,000 jobs in a single month (January 2009) at the height of the recession, the biggest one-month drop since February 1975.

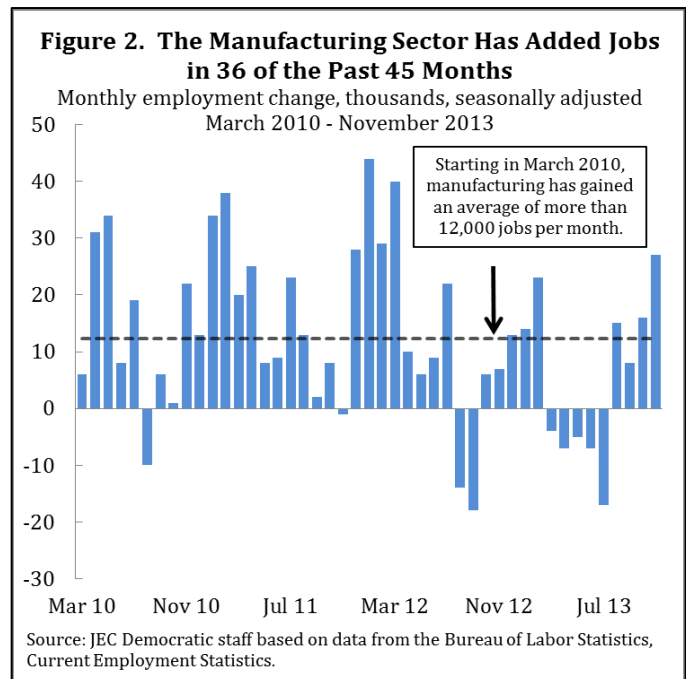
These job losses were particularly severe in the durable goods industries, which were responsible for 75% of manufacturing job losses even though they accounted for only about 60% of total manufacturing jobs at the outset of the recession.<sup>17</sup>

The disparate impact on durable goods reflected a typical pattern in the purchase of durable and nondurable goods. While the consumption of durables generally declines during recessions, the consumption of nondurables and services has often remained stable or even grown during recessions.<sup>18</sup> This occurs because durable goods purchases are more likely to be dependent on outside financing—which can dry up during economic downturns—and because economic uncertainty can cause consumers and businesses to become more cautious and defer spending. They can delay the purchase of new durable goods by substituting repairs, buying a used product or trading down to a less expensive item. In contrast, nondurable goods tend to be smaller purchases and are more immediately essential.

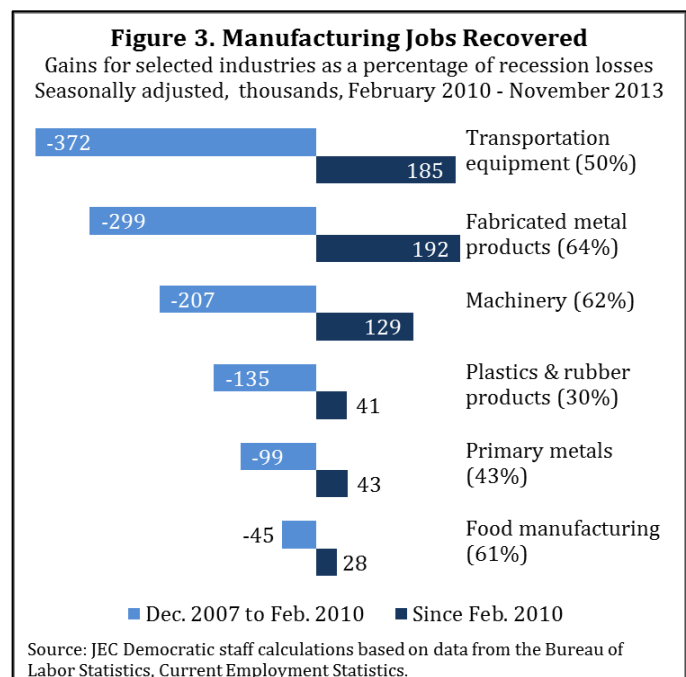
The biggest declines in durable goods manufacturing employment were related to the housing sector, including job losses in wood products (31%), furniture and related products (30%), nonmetallic mineral products including glass or bricks (24%) and primary metals such as iron, steel beams and pipes (22%).<sup>19</sup> (Table 1)

In addition, losses in household wealth—particularly the historic decline in home prices and stagnant incomes—severely reduced consumer spending during the recent recession. The result was the largest decline in real (inflation-adjusted) consumption in the past 40 years and a larger-than-usual impact on nondurable goods manufacturing.<sup>20</sup>

**Recovery:** Since the low point for manufacturing employment in February 2010 through November 2013, the U.S. economy has added 554,000 manufacturing jobs. This represents a 4.8% increase in the number of manufacturing jobs and 24% of the



manufacturing jobs lost in the recession. The economy has added manufacturing jobs in 36 of the past 45 months, gaining an average of more than 12,000 manufacturing jobs per month.<sup>21</sup> (Figure 2) Many of those job gains were in different areas of manufacturing than the jobs that were lost in the recession.<sup>22</sup> (Table 1) Several industries have regained more than half of the jobs lost from December 2007 through February 2010, while others are nearing the halfway mark. (Figure 3)



Much of this job growth may be attributable to businesses using their cash reserves to replace equipment and restock inventory. Increased consumer spending has also boosted demand, including for durable products such as cars.<sup>23</sup>

### Increasing Manufacturing Exports are Strengthening the Recovery

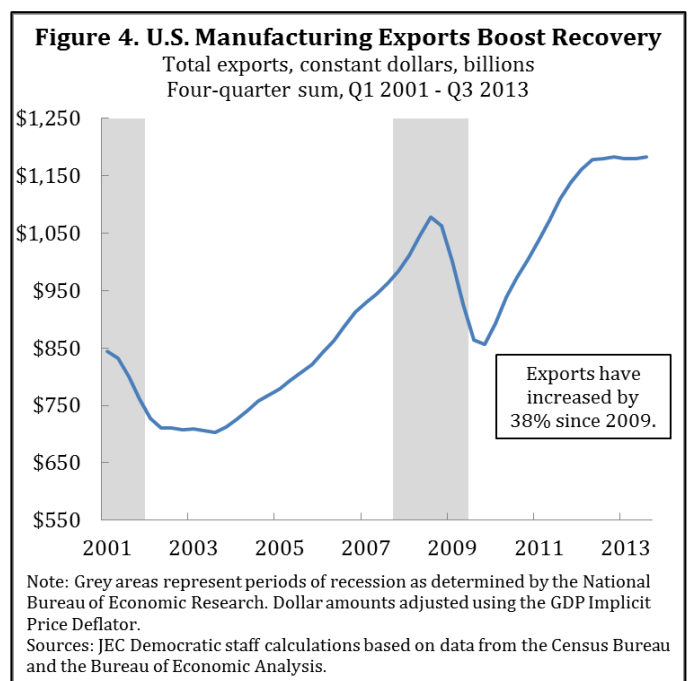
Increasing exports have played a critical role in the return of manufacturing jobs. Manufacturing exports over the past year totaled \$1.2 trillion, up 38% since 2009. Manufacturing exports now exceed the pre-recession peak. (Figure 4) Almost every manufacturing industry has seen an increase in the amount of exports over this time period.<sup>24</sup>

Exports represent a substantial share of manufacturing production and, in turn, support millions of manufacturing jobs. According to the most recent available data (2011), nearly 25% of manufacturing production is exported.<sup>25</sup> Assuming this share has held roughly constant, exports are now responsible for more than three million manufacturing jobs.<sup>26</sup> If the United States continues to accelerate exports of its manufactured goods, this would have an extremely positive effect on manufacturing employment.

### Signs the Manufacturing Revival May Continue

Recent trends suggest that the current expansion in manufacturing may continue. A handful of companies have announced plans to move production back to the United States from overseas, including Caterpillar, General Electric and Ford.<sup>27</sup> Lenovo, a computer manufacturer based in Beijing, opened a manufacturing plant in North Carolina in June of this year,<sup>28</sup> and BASF, a German-based chemical company, is also expanding operations in the United States.<sup>29</sup>

Several factors have made locating or relocating production in the United States more attractive for companies. First, U.S. worker productivity continues to rise across all sectors, and it has risen



especially fast in manufacturing. Between 1987 and 2008, manufacturing productivity grew at an annual rate of 3.4%, compared to 2.2% for all nonfarm business.<sup>30</sup> This translates into doubled worker productivity over that 20-year period.<sup>31</sup> Since then, productivity gains in manufacturing have continued to exceed gains in nonfarm business overall.<sup>32</sup>

Strong productivity performance in the United States is occurring at the same time that labor costs among key competitors, such as China, are increasing.<sup>33</sup> By one estimate, the savings from employing Chinese workers is on track to shrink from roughly \$17 per hour per worker in 2006 to about \$7 per hour per worker by 2015.<sup>34</sup> Manufacturers may also reshore jobs to cut down on transportation costs and uncertainty resulting from extended supply chains.<sup>35</sup> High oil prices can make it expensive to ship raw materials overseas and then transport finished products back to the U.S. market.

U.S. production of oil and natural gas has increased substantially in recent years, spurring infrastructure investments and increasing demand for mining-related machinery.<sup>36</sup> In October of this year, crude oil production exceeded imports for the first time since February 1995.<sup>37</sup> U.S. natural gas prices are less than half of what they are in Europe or Asia.<sup>38</sup>



Since a substantial share of U.S. electricity is produced from natural gas, manufacturers may expand U.S. production or bring production back home to take advantage of lower energy costs.<sup>39</sup> In addition, industries such as chemical manufacturing can realize further cost reductions because they use natural gas as a direct input in the production process. The chemical manufacturing industry will invest an estimated \$30 billion in the coming years to build chemical plants in the United States.<sup>40</sup>

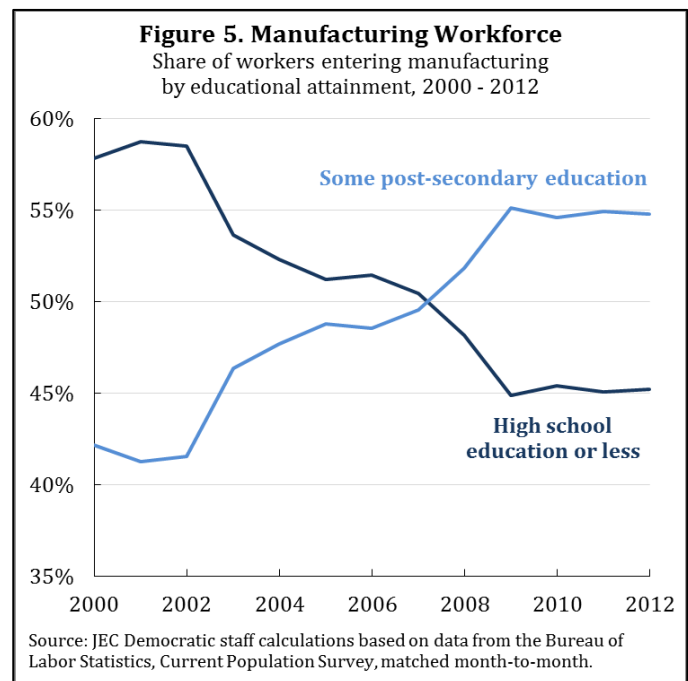
Manufacturing in the United States also allows companies to take advantage of synergies from locating research and development and production in close proximity. In addition, some executives have indicated that they are bringing production back home because of the United States’ stronger intellectual property protections.<sup>41</sup>

### Challenges Facing the Manufacturing Sector

Despite the recent positive trends in manufacturing, the sector needs to add 1.7 million jobs to return to pre-recession levels.<sup>42</sup> Challenges facing manufacturing include insufficient support for research and development, obstacles to accessing and competing in overseas markets, deteriorating transportation infrastructure and an outdated and overly complex tax and regulatory system.

Difficulty finding workers with the skills needed for the manufacturing jobs of the future is also a barrier to maximizing growth in the sector. One report found that 83% of American manufacturers surveyed reported a moderate or severe shortage of high-skilled workers—with approximately 600,000 high-skilled manufacturing positions going unfilled—and that the shortage is severe enough that it can impede production and innovation.<sup>43</sup>

The manufacturing skills gap is projected to deepen in the coming years. The manufacturing workforce is aging faster than other segments of the economy—about half of all employees are at least 45 years old.<sup>44</sup> The looming retirement of so many employees at a time when the sector is rebounding means that the demand for new talent to fill skilled-



production jobs should only grow.<sup>45</sup>

STEM skills will be increasingly important in advanced manufacturing fields. As investment in automation continues, employers will seek out workers better equipped to learn quickly, adapt to fast-changing technologies and develop these new, innovative technologies themselves.<sup>46</sup>

These trends are already in evidence. People who enter manufacturing today are more likely to have had post-secondary education than workers finding jobs in the sector in the past.<sup>47</sup> As **Figure 5** shows, in 2008, for the first time, the share of workers entering manufacturing who had post-secondary education surpassed the share of workers entering the field with a high school education or less.<sup>48</sup>

## Policy Solutions to Boost American Manufacturing and Close the Skills Gap

Continued growth in manufacturing requires policies to foster a dynamic manufacturing base and ensure an ample supply of skilled workers to fill the jobs of the future. Policies that would support domestic manufacturing can be divided into four categories:

1. Strengthening America's 21st century workforce;
2. Expanding access to capital;
3. Opening markets abroad; and
4. Creating the conditions necessary for growth.

### 1. Strengthening America's 21st century workforce

*Improving science, technology, engineering and math (STEM) education:* Manufacturing jobs of the future are likely to require STEM capabilities. Success in STEM education at all levels is dependent on providing adequate funding to help workers obtain the degrees, certifications and skills they need. Federal support for higher education, including Pell Grants, can ensure that the workforce has the skills to succeed in the 21st century economy.

Actions that would increase the size and capabilities of the STEM workforce include assisting K-12 schools in attracting talented STEM graduates as teachers, as well as implementing partnerships between educational institutions and the business community to help ensure that graduates learn the skills needed for the STEM workforce.

The Innovate America Act (S. 1777) would improve STEM education by doubling the number of STEM-focused high schools, promoting computer science training and expanding research opportunities for undergraduates in STEM majors. In addition, the legislation would promote U.S. exports and cut red tape for small- and medium-sized manufacturers.

*Expanding enrollment at community colleges and in career and technical education programs:* Community colleges play an integral role in preparing people for job openings in growing industries of manufacturing. In many areas throughout the country, community colleges are uniquely in tune with the needs of local and regional employers and can tailor their offerings to match them. Employers can work with community colleges to integrate trade-specific credentials into formal degree programs, which would provide a pathway from training to employment.

*Increasing the participation of women in manufacturing:* Women are underrepresented in manufacturing and have not shared in the sector's recent job gains.<sup>49</sup> While, overall, the sector has added 554,000 jobs since February 2010, men have gained 565,000 jobs during that time, and women have lost 11,000 jobs.<sup>50</sup> Women's share of manufacturing employment is now 27%, the lowest level it has been since 1971.<sup>51</sup>

Increasing STEM education participation and proficiency for girls beginning as early as elementary school, and equipping women with the skills and knowledge desired by manufacturing employers through vocational and community college programs, would help draw more women into the field.<sup>52</sup> The Women and Minorities in STEM Booster Act (S. 288) would create a program that awards competitive grants to colleges and nonprofit organizations to increase the participation of women and underrepresented minorities in STEM.

Solutions should also focus on increasing the ranks of women in manufacturing leadership roles. This has proven to boost bottom lines and would demonstrate to women that there is a path for career growth in the sector.<sup>53</sup>

*Helping veterans transfer their skills to the manufacturing sector:* Manufacturers have historically employed a larger share of veterans than private-sector employers overall.<sup>54</sup> However, many recent returning veterans have struggled to find jobs, in part due to the shift in the manufacturing

sector toward different types of jobs than those veterans may have left before joining the military.

A number of actions have been taken to improve transitions for returning veterans. These include federal and state government programs, private-sector initiatives and public-private partnerships.<sup>55</sup> Collectively, these efforts have contributed to improving recent veterans' employment prospects, as evidenced by the over two-percentage-point decline in the post-9/11 veterans' unemployment rate from 2011 to 2012.<sup>56</sup>

Streamlining state occupational licensing would help veterans with equivalent military skills and abilities meet credentialing requirements for jobs. Efforts should also include improving higher education opportunities for returning veterans so they can obtain the training required for available jobs and gain the assistance they need to transition from active duty to the civilian workplace.

*Supporting effective worker-training programs for the long-term unemployed:* About one million currently unemployed workers came from jobs in the manufacturing sector.<sup>57</sup> Many of these workers have been unemployed for more than six months.<sup>58</sup>

The United States spends considerably less than other developed countries on labor-market policies, including workforce training and job-search programs, both as a share of GDP and per labor-market participant.<sup>59</sup> Policymakers should focus efforts on modernizing and reforming federal job training programs to ensure that the programs are as efficient and effective as possible.

The AMERICA Works Act (S. 453) would encourage federal agencies that support job training programs to give priority consideration to programs that offer industry-recognized and nationally portable credentials. Additionally, the On-the-Job Training Act (S. 1227) would create grants for on-the-job training, including programs for dislocated workers.

One approach to workforce training would be to focus resources on the types of industries strongest

in each geographic region. The SECTORS Act (S. 1226) takes this approach. Sectoral programs identify fields that offer strong growth opportunities in a community and work with nonprofit organizations and private-sector employers to craft programs that build skills that will be in demand. Sectoral program participants have been more likely to obtain and retain employment than those who have not received such training.<sup>60</sup>

## 2. Expanding access to capital

*Spurring innovation:* Growth in the manufacturing sector depends on businesses being able to access the financing they need to conduct research and development, recruit and train workers, expand their operations and improve their capacity to ship products overseas.

The Manufacturing Reinvestment Account Act (S. 1651) would allow businesses to establish accounts where they can make annual pre-tax contributions of up to \$500,000 that may be held in the accounts for up to seven years. Amounts disbursed from the accounts would be effectively taxed at a rate of 15% if they are used for equipment, facilities or job training.<sup>61</sup>

The Job Creation through Energy Efficient Manufacturing Act (S. 1501) would authorize funding for the Department of Energy to provide competitive grants to states for new or expanded industrial energy efficiency financing programs. These programs would provide low-cost loans to manufacturers to help cover the up-front cost of retrofits to improve energy efficiency. These retrofits would save businesses money over the long term, freeing up capital for other purposes.

The Startup Innovation Credit Act (S. 193) would help new manufacturers get access to and benefit from the research and development tax credit by allowing them to claim a credit against their payroll taxes. Because they may not yet turn a profit, these firms are often unable to qualify for the tax credit. In addition, policymakers should consider making the tax credit permanent to provide certainty to all manufacturers.

*Improving transportation infrastructure:* An effective transportation system reduces transport costs for businesses and consumers.<sup>62</sup> Those reduced costs, in turn, allow firms easier access to new markets, foster competition, spur innovation and raise productivity.<sup>63</sup> A well-functioning infrastructure system also boosts exports.<sup>64</sup>

However, infrastructure surveys show that the United States is falling behind in transportation infrastructure investment and maintenance compared to global competitors.<sup>65</sup> According to the American Society of Civil Engineers, the United States needs to spend \$3.6 trillion to bring its infrastructure “into good repair” by 2020.<sup>66</sup>

Passing a long-term surface transportation reauthorization bill, improving water infrastructure and dedicating resources to maintaining existing infrastructure would improve U.S. export capabilities. Establishing a national infrastructure financing authority and authorizing the issuance of bonds to fund projects are examples of potential public-private partnerships that could also strengthen U.S. infrastructure.

### 3. Opening markets abroad

Exports are critical to the success of American manufacturing. Policymakers should ensure that manufacturers large and small have opportunities to export their products overseas.

The Currency Exchange Rate Oversight Reform Act (S. 1114) would help counter the harm to U.S. manufacturers caused by currency manipulation and provide consequences for countries that fail to adopt appropriate policies to eliminate currency misalignment. Undervalued foreign currencies place U.S. exporters at a competitive disadvantage and can hinder manufacturing job growth.

The Small Business Export Growth Act (S. 1179) would help small businesses capitalize on export opportunities by improving federal export assistance programs for small firms and cutting red tape. It would also create a new interagency task force on small business export financing.

In addition, policymakers should continue to undertake efforts to reform export regulations. The federal government is currently seeking to make the defense export system more efficient by creating a unified list of restricted items at one agency, rather than having lists at multiple agencies.<sup>67</sup> This unified list will help defense subcontractors and other manufacturers that make parts that are used in military equipment but are not exclusively military products.

### 4. Creating the conditions necessary for growth

*Developing long-term strategies and plans:* Continued growth in the manufacturing sector requires setting long-term goals and designing strategies and plans to meet them. This will involve coordinating across agencies and levels of government, engaging the manufacturing sector through public-private partnerships and fostering connections between educational institutions and the sector.

One proposal to address the need for long-term planning is the Rebuild American Manufacturing Act (S. 544), which would mandate the development of a national manufacturing strategy. In addition, the Made in America Manufacturing Act (S. 63) would establish an incentive grant program for states or regional partnerships to create manufacturing enhancement strategies. These strategies could include a variety of components to boost growth in the manufacturing sector and improve job training.

*Enacting smarter tax and regulatory policies:* Policymakers should streamline the tax code, making sure that tax policy promotes greater economic growth and investment. No matter the structure under which a business operates, comprehensive tax reform should be done in a way that makes the tax code more simple, fair and competitive for businesses.

In addition, the Bring Jobs Home Act (S. 337) would support domestic manufacturing by establishing a tax credit to defray costs associated with onshoring production and moving jobs back to

the United States, and by eliminating the deductibility of expenses incurred when moving operations overseas.

Steps can also be taken to improve the federal regulatory process in order to maximize regulations' benefits for the economy and minimize any costs they might impose. Retroactive analysis of regulations to determine whether they are working is one option that could improve the regulatory process.<sup>68</sup> The Strengthening Congressional Oversight of Regulatory Actions for Efficiency Act (S. 1472) would establish a Regulatory Analysis Division within the Congressional Budget Office that would assess the impact of federal regulations, including by conducting ex-post reviews.

## Conclusion

Manufacturing has long been critical to the strength of the U.S. economy. The sector has driven innovation that has contributed substantially to Americans' quality of life, and it has provided good middle-class jobs for generations of families. Manufacturing was hit hard by the recent recession, a culmination of three decades of decline from the sector's peak. However, manufacturing has experienced a comeback in recent years. Conditions are ripe for a continued expansion of American manufacturing, but policy actions are needed to further these gains and close the skills gap for the manufacturing jobs of the future.

**Table 1. Employment Change in Manufacturing Industries, Seasonally Adjusted**

Industry	Recession (Dec. 2007 - Feb. 2010)		Recovery (Feb. 2010 - Nov. 2013)		Jobs gained/lost during the recovery as a percentage of recession losses*	Number of jobs needed to return to pre-recession level (thousands)**
	Number (thousands)	Percent change	Number (thousands)	Percent change		
<b>Manufacturing total</b>	<b>-2,286</b>	<b>-16.6%</b>	<b>554</b>	<b>4.8%</b>	<b>24.2%</b>	<b>1,732</b>
<b>Durable goods industries</b>	<b>-1,717</b>	<b>-19.7%</b>	<b>570</b>	<b>8.2%</b>	<b>33.2%</b>	<b>1,147</b>
Wood products	-157	-31.4%	12	3.6%	7.9%	144
Nonmetallic mineral products	-118	-24.2%	3	0.7%	2.3%	116
Primary metals	-99	-22.1%	43	12.2%	43.1%	57
Fabricated metal products	-299	-19.2%	192	15.2%	64.0%	108
Machinery	-207	-17.5%	129	13.2%	62.1%	79
Computer and electronic products	-163	-13.0%	-14	-1.3%	-8.5%	177
Electrical equipment and appliances	-74	-17.2%	11	3.0%	14.3%	63
Transportation equipment	-372	-22.0%	185	14.0%	49.7%	187
Furniture and related products	-154	-29.9%	-1	-0.4%	-0.9%	155
Miscellaneous	-74	-11.5%	11	2.0%	15.3%	62
<b>Nondurable goods industries</b>	<b>-569</b>	<b>-11.3%</b>	<b>-16</b>	<b>-0.4%</b>	<b>-2.8%</b>	<b>585</b>
Food manufacturing	-45	-3.0%	28	1.9%	61.0%	18
Textile mills	-43	-26.3%	-5	-4.2%	-11.7%	48
Textile product mills	-34	-21.9%	-6	-4.8%	-17.3%	39
Apparel	-47	-22.6%	-21	-13.0%	-44.5%	68
Paper and paper products	-57	-12.5%	-23	-5.7%	-40.3%	79
Printing and related support activities	-120	-19.5%	-50	-10.1%	-41.8%	170
Petroleum and coal products	-1	-0.8%	2	1.3%	166.7%	-1
Chemicals	-68	-8.0%	6	0.8%	9.2%	62
Plastics and rubber products	-135	-18.0%	41	6.7%	30.5%	94
Miscellaneous	-20	-8.6%	12	5.9%	62.6%	7

Note: Numbers may not sum due to rounding. (\*)Negative percentage indicates further losses during the recovery. (\*\*) Negative number indicates that recovery gains exceed recession losses.

Source: JEC Democratic staff calculations based on data from the Bureau of Labor Statistics, Current Employment Statistics.

**Sources:**

- <sup>1</sup> JEC Democratic staff calculations based on data from the Bureau of Economic Analysis, Gross-Domestic-Product-(GDP)-by-Industry Data, Updated April 25, 2013; JEC Democratic staff calculations based on data from the Bureau of Labor Statistics, Current Employment Statistics.
- <sup>2</sup> See endnote 26 for further information related to this statistic.
- <sup>3</sup> Moretti, Enrico, “Local Multipliers,” *American Economic Review*, Papers & Proceedings 100, May 2010. <http://emlab.berkeley.edu/~moretti/multipliers.pdf>.
- <sup>4</sup> Bivens, Josh, “Updated Employment Multipliers for the U.S. Economy, Economic Policy Institute, 2003. <http://pbadupws.nrc.gov/docs/ML1224/ML12243A398.pdf>.
- <sup>5</sup> JEC Democratic staff calculations based on data from the Bureau of Economic Analysis, Industry Data, Input-Output Accounts, Industry-by-Industry Total Requirements after Redefinitions (1998 to 2011); See also National Association of Manufacturers, “Facts About Manufacturing in the United States,” Accessed November 13, 2013. [www.nam.org/Statistics-And-Data/Facts-About-Manufacturing/Landing.aspx](http://www.nam.org/Statistics-And-Data/Facts-About-Manufacturing/Landing.aspx).
- <sup>6</sup> Economics and Statistics Administration, Department of Commerce, “The Earnings of New Hires in Manufacturing,” ESA Issue Brief #02-13, August 2013. Data through the end of 2011. <https://www.esa.doc.gov/sites/default/files/reports/documents/theearningsofnewhiresinmanufacturingaugust2013.pdf>.
- <sup>7</sup> Economics and Statistics Administration, Department of Commerce, “The Benefits of Manufacturing Jobs,” ESA Issue Brief #01-12, May 2012. <http://www.esa.doc.gov/sites/default/files/reports/documents/1thebenefitsofmanufacturingjobsfinal5912.pdf>.
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- <sup>9</sup> Sperling, Gene, “The Case for a Manufacturing Renaissance,” The Brookings Institution, July 25, 2013. [http://www.whitehouse.gov/sites/default/files/docs/the\\_case\\_for\\_a\\_manufacturing\\_renaissance\\_gene\\_sperling\\_7-25-2013\\_final\\_p....pdf](http://www.whitehouse.gov/sites/default/files/docs/the_case_for_a_manufacturing_renaissance_gene_sperling_7-25-2013_final_p....pdf).
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