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Hearing on

"Where the Jobs Are: Can American Manufacturing Thrive Again?"

Before the House Energy and Commerce Committee

Subcommittee on Commerce, Manufacturing, and Trade

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Chairman Bono-Mack, Mr. Butterfield and members of the Committee, I appreciate the opportunity to appear before you to discuss the past trends and current condition of U.S. manufacturing and the kinds of federal policies needed to restore U.S. manufacturing growth.

I am the president and founder of the Information Technology and Innovation Foundation (ITIF). ITIF is a non-partisan research and educational institute whose mission is to formulate and promote public policies to advance technological innovation, productivity and competitiveness.

This is a timely and important hearing, for American manufacturing competitiveness has declined significantly in the last decade in particular, costing jobs and impeding economic growth. Understanding the causes of this decline is critical if we are to make the kinds of policy changes needed to restore U.S. global leadership.

Summary

Much of the debate around U.S. manufacturing is problematic because the core data on manufacturing output and productivity are flawed. The reality is:

- A large share of manufacturing jobs was lost in the last decade because the United States lost its competitive edge for manufacturing.
- The loss was unprecedented, and it continues to severely impact the overall U.S. economy.
- Regaining U.S. manufacturing competitiveness to the point where America runs a trade surplus in manufacturing products is critical to restoring U.S. economic vibrancy.
- Regaining manufacturing competitiveness will create millions of higher-than-average-wage manufacturing jobs and an even greater number of jobs from the multiplier effect in other sectors of the economy.
- The United States can restore manufacturing competitiveness and balance manufacturing goods trade within less than a decade if it adopts the right set of policies in what can be termed the "four T's" (tax, trade, talent, and technology).

Why Manufacturing Matters to America

Should policy makers place more emphasis on manufacturing than other industries? For the neoclassical economists who largely preside over economic discourse in Washington, the answer is "manufacturing jobs matter no more than jobs in any other industry." Michael Boskin, former economic advisor for President George W. Bush, reportedly stated: "computer chips, potato chips, what's the difference?"[1] More recently, Christina Romer, former head of the Council of Economic Advisors in the Obama administration, wrote in *The New York Times* that manufacturing doesn't matter.[2]

For these economists, the decline in manufacturing jobs implies a transition from employment in one type of industry to another. In an efficient global marketplace, a competitive economy will shed jobs in one industry if the relative value of labor is higher in other industries. If in 1980 the U.S. economy had more manufacturing workers than retail

workers, but in 2011 it had more retail workers than manufacturers, the market must then prefer retailing to manufacturing, and thus the employment shift is the optimal outcome. Any attempt to favor a particular sector, such as manufacturing or other traded sectors like software, can only retard this growth-enhancing reallocation of resources.

There are a number of critical flaws in this logic. One is that it was not the market that led to U.S. losses; it was other nations' competitiveness policies focused on manufacturing, many of them mercantilist and protectionist in nature. Neoclassical economists may not like these policies, but their liking them or not is irrelevant to their existence and effect.

More importantly, the central thesis of the argument is flawed because manufacturing jobs are not the same as all other jobs in the economy. Supporters of manufacturing offer many valid arguments for why manufacturing jobs are more critical than jobs in most other sectors. These include: manufacturing jobs pay more; manufacturing is a source of good jobs for non-college-educated workers; and manufacturing is the key driver of innovation—without manufacturing, non-manufacturing innovation jobs (for example, research and design) will not thrive.[3]

But the central reason why manufacturing matters is that it is a key enabler of traded sector strength. And, in a global economy, it is impossible to have a vibrant national economy without a globally competitive traded sector.[4] Manufacturing is still the largest traded sector of the United States economy, and it will be for some time. While some argue that the United States can close its trade deficit by boosting exports of services or non-manufactured goods (principally agricultural products or energy exports such as natural gas), the facts suggest otherwise.[5]

Traded sector jobs are important, in part, because they have high employment multipliers. This is the primary reason why all 50 states – regardless of whether they are "red" or "blue" states – focus their economic development efforts on traded industries like manufacturing and software, and not on non-traded industries like retail trade and personal services like hair salons. If a hair salon closes, another will take its place to serve local demand. But if a manufacturer closes, another may take its place, but not necessarily in the same state. This is true at the national level. Lost manufacturing jobs may not be replaced, at least in the short run, and this loss leads through the multiplier effect of the loss of around 2.3 other jobs in the overall U.S. economy.[6] As such, the anemic overall job performance in the last decade was directly related to the 32 percent loss of manufacturing jobs. The erosion of the manufacturing base turned the U.S. economy into a leaky boat with worn sails. For most of the 2000s, manufacturing's decline bestowed slow economic growth. Late in the decade, it helped turn a recession into "The Great Recession."

There is another, more subtle, but ultimately more significant impact of the decline of manufacturing on the U.S. economy: it erodes the confidence of businesses, workers and consumers. Ultimately, a strong and sustained recovery will depend on the faith that America will once again lead in the global economy. If that faith is absent or, worse, if there is a sense of economic foreboding and decline, then the United States will lack the rational exuberance needed to power investment and spending, and the recovery will continue to drag.

As Keynes noted, "Most, probably, of our decisions to do something positive, the full consequences of which will be drawn out over many days to come, can only be taken as the result of animal spirits—a spontaneous urge to action rather than inaction, and not as the outcome of a weighted average of quantitative benefits multiplied by quantitative probabilities."[7] Had manufacturing expanded in the last decade instead of contracting, not only would America's economy be much healthier, but so too would be its "animal spirits."

U.S. Manufacturing Competitiveness Has Declined

America is facing a competiveness crisis. We see this most evidently in the unprecedented rate of manufacturing job loss over the last decade. U.S. non-farm employment expanded by 19 percent in the 1980s and 20 percent in 1990s. During the same periods, manufacturing employment fell only slightly, by seven percent and one percent respectively. But from 2000 to 2011, total employment was unchanged while manufacturing jobs fell by one-third (a loss of 5.4 million manufacturing jobs).[8] (see figures 1 and 2) This was worst performance in American history in terms of manufacturing job loss, exceeding the rate of loss in the Great Depression.[9] Only two states—Alaska and North Dakota—saw less than double-digit declines in manufacturing employment, and in neither state is manufacturing a substantial part of the economy.

Figure 1: Total and Manufacturing Employment Change in the last Three Decades (Source: U.S. Bureau of Labor Statistics)

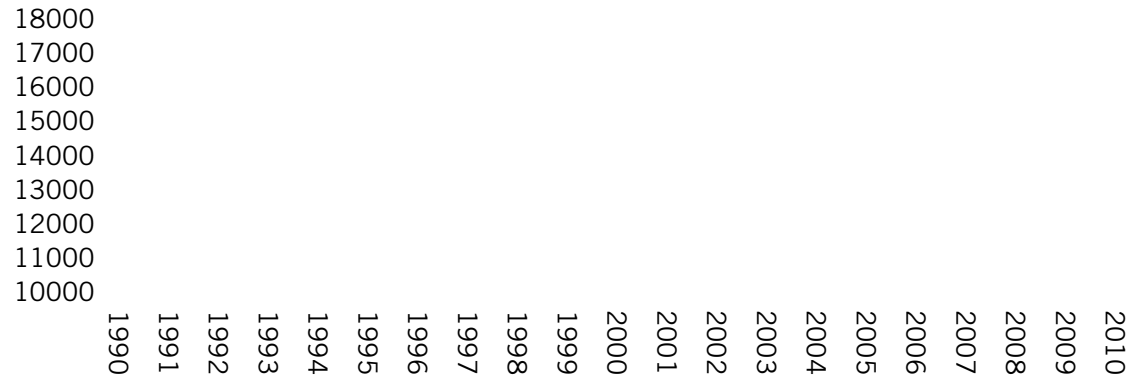

Figure 2: Decline in U.S. Manufacturing Employment (millions), 1990-2010[10]

And according to the OECD, from 1997 to 2010 the United States had the second largest share of manufacturing job loss (controlling for adult population growth) of ten nations examined. (see Figure 3)[11]

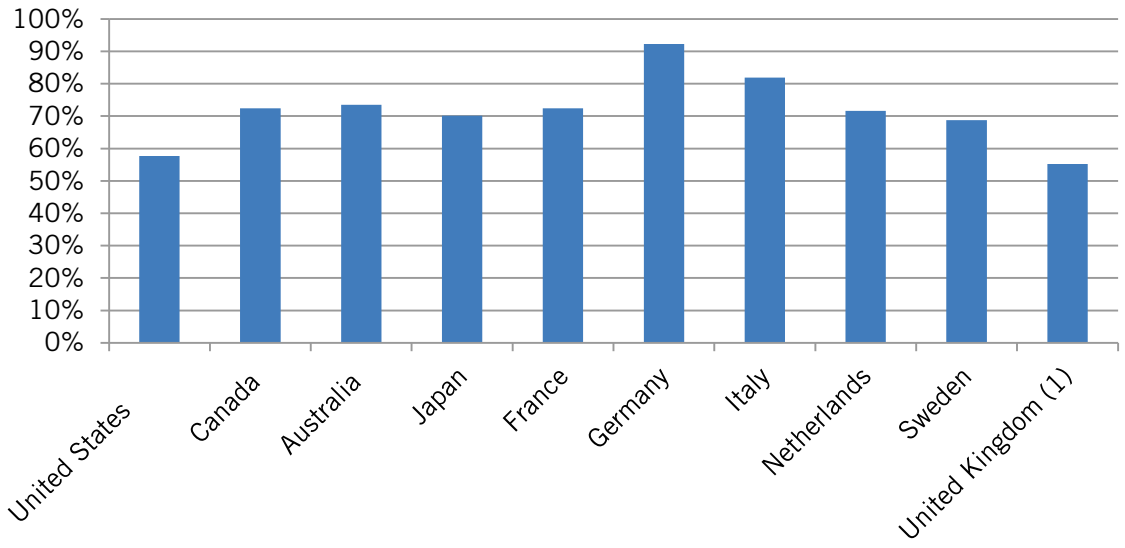

Figure 3: Manufacturing Job Change as a Share of Adult Population Growth, 1997 to 2010 (Source: OECD)

Yet remarkably almost no one has made the connection between the anemic overall job performance in the last decade and the largest drop in manufacturing employment in American history. The common assumption is that the United States is still a manufacturing powerhouse but we need fewer workers to produce the same output. Manufacturing, many economists and pundits argue, has simply become incredibly productive. While tough on workers who are laid off, outsized job losses actually indicate superior performance.

But that is not the complete story. In fact, it is also a story of output decline. In 2010, 13 of the 19 U.S. manufacturing sectors (employing 55 percent of manufacturing workers) were producing less than in 2000 in terms of change in real value-added output.[12] In other words, while the U.S. economy grew 17 percent, these industries actually shrank. The only reason reported overall manufacturing output as a share of GDP increased was because of the massive output growth of NAICS 334, the computers and electronics industry, whose growth ITIF argues is significantly overstated by the U.S. Bureau of Economic Analysis.[13] In addition, BEA overestimates output growth because the offshoring of global supply chains can lead to the appearance of productivity growth, even though a domestic manufacturer's productivity may not have improved. This phenomenon is known as "import substitution bias".

ITIF estimates that if the official government output measures had been measured correctly, the United States would have experienced an absolute decline in manufacturing output over the past decade of approximately 11 percent instead of the recorded 16 percent increase, something that has not happened before, at least since WWII.[14] Moreover, ITIF estimates that manufacturing productivity grew by just 32 percent, not the reported healthy number of 72 percent indicated by Bureau of Economic Analysis data.[15]

If manufacturing productivity growth was actually 72 percent in the 2000s, one would expect that U.S. manufacturers would have added plenty of machines and factories over the last decade to be more productive, as they have done every decade since WWII. In fact, total U.S. manufacturing capital stock increased just 2 percent, compared to historic rates of growth of between 20 and 50 percent per decade.

Thus, while superior productivity increases played some role in the collapse of U.S. manufacturing employment in the last decade, the overriding factor was output decline, highlighted by a striking result: if from 2000 to 2010 manufacturing output had grown at the same rate as that of the rest of the business sector, the United States would have 3.8 million more manufacturing jobs today and at least another four to six million jobs from the multiplier effect.

As such, the conventional wisdom that U.S. manufacturing job loss is simply a result of productivity-driven restructuring (akin to how U.S. agriculture lost jobs but is still healthy) is fundamentally flawed. U.S. manufacturing lost jobs because manufacturing lost output, and it lost output because its ability to compete in global markets – some manipulated by egregious foreign mercantilist policies, others supported by better national competiveness policies, including much lower corporate tax rates and stronger investment tax incentives – declined significantly.

Even if experts acknowledge that manufacturing's share of output has declined, many comfort themselves with a narrative that such decline is inevitable. "Manufacturing is in decline everywhere, even in China," they argue. In fact, while manufacturing has declined as a share of GDP in some nations (notably Canada, Italy, Spain, the United Kingdom, and the United States), it is stable or growing in many others (including Austria, China, Finland, Japan, Korea, and Sweden). Nor is the loss of U.S. manufacturing is not due to some inexorable shift to a post-industrial economy: the consumption of manufacturing goods comprises about the same share of the U.S. economy as it did a generation ago. What's different is that manufacturing *production* does not, because the goods trade deficit has skyrocketed.

Others will point out that, when measured in U.S. dollars, U.S. manufacturing output is still the highest in the world, 46 percent higher than that of China, the country in second place.[16] But of course U.S. manufacturing output is higher than any other nation, including China, because U.S. GDP is higher than any other nation. Any comparison must be adjusted to account for the size of the economy. The United States is performing poorly relative to its competitors in the growth in manufacturing output relative to the growth in GDP. The United States ranks 16th of 19 countries in the change of the ratio of manufacturing real value added to real GDP when the U.S. numbers are adjusted for statistical bias. (See Figure 4)

Notwithstanding these trends, some have attempted to make the case that manufacturing is in the midst of a rebound and that all will be well shortly. But the current rebound looks as good as it does only because the prior loss was so steep. The United States lost two million manufacturing jobs during the Great Recession, and since then a little over 166,000, or 8.2 percent, have returned. At the rate of growth in manufacturing jobs in 2011, it would take until 2020 to return to where the economy was in terms of manufacturing jobs at the end of 2007. This performance is also much weaker than most post-war recoveries. Manufacturing jobs were up just 0.7 percent in the 30 months since the end of the recession, and only 1.4 percent by February 2012. By contrast, manufacturing added between 6.8 and 9.0 percent in the 30 months succeeding the recessions in 1969, 1974, and the early 1980s. For every 12 manufacturing jobs lost during the Great Recession, only one had returned by February of 2012.[17] Moreover, annual new orders for manufacturers are down 11 percent from 2007 to

2010 in constant dollars, while durable goods orders are down even more, 21 percent.[18] Moreover, the trade deficit in non-petroleum products in 2011 at an annualized basis is $440 billion, 11 percent higher than in 2010 and 40 percent higher than in 2009.[19]

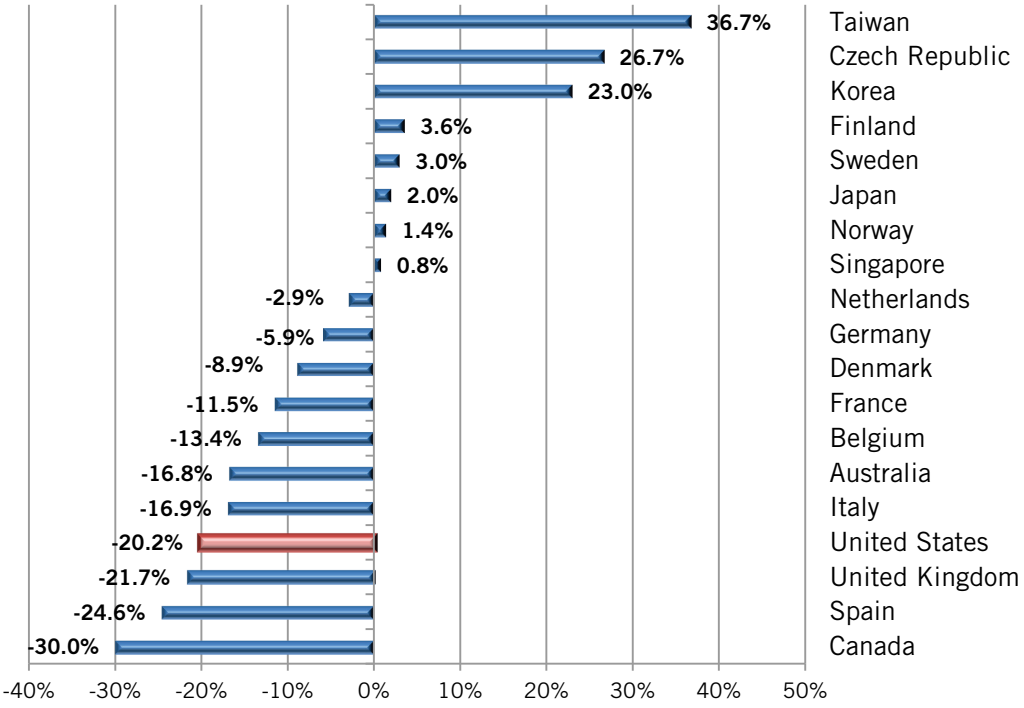

Figure 4: Percent Change in Ratio of Manufacturing Real Value Added to Real GDP (U.S. manufacturing output and GDP adjusted), 2000-2010[20]

What Should Congress Do?

The prospects for U.S. manufacturing is certainly not all bleak. Some trends are moving in the right direction. The U.S. dollar continues to get weaker, as it should. America's new discoveries and drilling of natural gas is resulting in a much lower cost feed stock for industries dependent on natural gas. And some companies are reconsidering initial decisions to offshore work to lower wage nations, engaging in what is called more accurate full-cost accounting.

But notwithstanding these trends, it would be extremely risky to assume that government can sit back and not do anything and expect a manufacturing recovery to naturally emerge. Effective public policies that support and underpin the U.S. manufacturing economy are required if the United States is to experience sustained recovery and revitalization of manufacturing. We need a comprehensive national traded sector, manufacturing-focused strategy that addresses the "4 Ts" of technology, talent, tax, and trade. An ITIF report in May of this year will lay out a detailed strategy with specific policy recommendations for Congress and the Administration. For now, I'd like to focus on the three most important areas where Congress can act to restore U.S. manufacturing competitiveness. First, America needs a more competitive corporate tax code and one focused on spurring investment in the United States. Second, the federal government needs to take much more aggressive and determined action to combat and roll back what ITIF terms "innovation mercantilism" practiced by many U.S. competitors, particularly China, but increasingly nations like Brazil

and India. And third, the federal government needs to invest in a national manufacturing technology system.

Make the U.S. Tax Code More Internationally Competitive, Especially for Traded Sectors Like Manufacturing: As you consider corporate tax reform I would encourage you to keep two key things in mind. First, unless corporate tax reform is *not* revenue neutral it will not effectively address America's competitiveness challenge. As of April 1st the United States attained the dubious distinction of having the highest statutory corporate tax rate, after Japan lowered their rate. Some will say that while the U.S. statutory rate may be the highest, our effective rate is much more competitive. But a recent National Bureau of Economic Research working paper examining cross-country comparisons of corporate income tax rates found that of 20 nations and regions, the United States had the second highest effective corporate tax rate (with Japan the highest).[21] Moreover, of ten nations with data going back to 1989, only the United States saw an *increase* in effective corporate tax rate. The other nine, including nations like Canada, France, Switzerland, and the United Kingdom, and, all saw reductions in their effective corporate rates. Unless America lowers its statutory and effective corporate tax rates, the U.S. tax code will continue to act as a deterrent to U.S. competitiveness.

The second is to distinguish between tax incentives that are pro-growth and those that are not. Not all tax "distortions" are harmful to growth. In fact, some are solidly pro-growth and if efforts to reform the corporate tax code eliminate these incentives in the effort to get rate reduction, overall U.S. economic growth and competitiveness will likely suffer. Thus effective corporate tax reform means retaining and even expanding pro-growth incentives. As such, I urge you to support and expand the three key existing production-oriented incentives: accelerated depreciation (expand it to become full first year expensing); the domestic production deduction (lower the rate as called for by the Administration), and expand the Alternative Simplified R&E tax credit from 14 percent to 20 percent.

More Effectively Combat Foreign Mercantilist Practices: Even if the United States had a much more competitive tax code, it would still not be enough to restore U.S. manufacturing competitiveness as long as other nations continue to engage in rampant mercantilist practices, such as intellectual property theft, forced technology transfer, standards manipulation, currency manipulation, market access restrictions, and having large parts of their economies dominated by favored state-owned enterprises. Some will argue that mercantilists only hurt themselves and that America can turn a blind eye to these practices. But if we really believe this why do we bother being in the WTO and supporting the global trading rules: because we are altruistic? Even if mercantilists hurt themselves, they also hurt American companies and the American economy. How do we expect U.S. firms to compete with China, for example, when they systemically steal and extort technology and intellectual property from them?

It is therefore time that the United States to take stronger action against these mercantilist policies and practices. The United States can and should take a number of specific steps unilaterally, but it should also encourage its like-minded trading partners to collectively take steps on a multilateral basis, including through the WTO.

There is more that the United States can do under existing authorities. But this will require making confronting foreign mercantilism the top goal of U.S. trade policy. Moreover, it will

require expanding the resources of the United States Trade Representative's Office and changing its strategic focus. Given the scope of the challenge of fighting global mercantilism, USTR is significantly underfunded. The United States invests just 0.007 percent as much on defending its economy globally as it does on defending our nation militarily.[22] Congress should create within USTR an ambassador-level U.S. trade enforcement chief and also fully fund the $26 million requested by the Obama Administration in the FY 2013 budget to create an Interagency Trade Enforcement Center.[23] Even in a time of fiscal austerity, a modest expansion of the USTR budget, particularly tied to increased enforcement, may well be the best money the federal government will spend. Congress should also increase funding for U.S. Customs to step up inspection for foreign counterfeit goods. The U.S. government needs to make it extremely costly for companies in foreign nations to ship counterfeit goods into the United States by seizing and destroying the lion's share of such products at our borders.

Establish a National Manufacturing Technology Initiative: For a variety of reasons, companies under-invest in key manufacturing technologies. This is especially the case in the United States where financial markets pressure U.S. companies to invest for short-term returns, which means they often skimp on longer-term technology investments. As the Business Roundtable reported, "The obsession with short-term results by investors, asset management firms, and corporate managers collectively leads to the unintended consequences of destroying long-term value, decreasing market efficiency, reducing investment returns, and impeding efforts to strengthen corporate governance."[24]

While the United States still does an adequate job of inventing technologies – although even there we are slipping – it does less well investing in the ability to manufacture those technologies in America.[25] Yet, U.S. competitive advantage will stem from producing more advanced and complex products in more efficient ways. Unfortunately the U.S. manufacturing economy is increasingly less high-tech than that of its competitors: whereas 42 percent of U.S. manufacturing occurred in medium-high tech or high-tech industries in 2009, 58 percent of German, 52 percent of Korean, and 48 percent of Japanese manufacturing occurred in such industries.[26] The federal government needs to play a key partnership role with industry in investing in early stage, pre-competitive manufacturing technologies.

As such Congress should fund a national initiative for advanced manufacturing technology consortia conducting applied R&D across several advanced technologies. Such an initiative might be called the Edison Engineering and Manufacturing Institutes (EEMI's). In part, these could be modeled after Germany's 57 Fraunhofer Institutes which perform applied research of direct utility to private and public enterprise.[27] The Fraunhofers bring together cutting-edge research in an industrially relevant way across a number of sectors and technology platforms (such as advanced machining, optics, photonics, nanotechnology, robotics, advanced materials and surfaces, wireless technologies, and many others) by providing a platform for joint pre-competitive research, bilateral applied research with individual firms, prototype manufacturing, and pre-production and cooperative technology transfer arrangements with companies.[28] Congress should authorize and appropriate the requisite funding to implement a national network of EEMI's.

Conclusion

U.S. manufacturing is at a critical inflection point. Continued absolute and relative decline could well produce within a decade a U.S. economy that looks more like Great Britain, with a hollowed out manufacturing sector and great difficulty being even marginally competitive in global markets without a significant decline in the value of the dollar. The solution to this challenge needs to go beyond partisan differences: we need a more competitive tax code and smarter regulations, but we also need increased public investment in manufacturing technology programs and programs to ensure a trained manufacturing workforce at all levels. Absent robust and sustained action by Washington, I fear that in a decade U.S. manufacturing will be have continued its decline, with the negative consequences for jobs, income and GDP growth.

Endnotes

1. Richard McCormack, "U.S. Military Fails to Learn an Ancient Military Lesson: No Industrial Economy Equals No Army," *Manufacturing and Technology News*, October 17, 2008, http://www.manufacturingnews.com/news/08/1017/commentary.html.
2. Christina Romer, "Do Manufacturers Need Special Treatment?" *New York Times*, February 4, 2012, http://www.nytimes.com/2012/02/05/business/do-manufacturers-need-special-treatment-economicview.html.
3. Gary Yakimov and Lindsey Woolsey, Innovation and Product Development in the 21st Century (Gaithersburg, MD: National Institute of Standards and Technology, February 2010), http://www.nist.gov/mep/upload/MEP_advisory_report_4_24l.pdf. U.S. manufacturing jobs, on average, pay 9 percent more in wages and benefits than jobs in the overall economy.; While manufacturing workers are becoming more educated and skilled, still 47 percent of U.S. manufacturing workers have not completed education beyond high school (with about 36 percent of the U.S. manufacturing workforce having high school but no college education and 11 percent not having completed high school).
4. Traded sector companies are domestic firms that derive a significant portion of their revenue from foreign sources.
5. And while the United States does run a trade surplus in services, that positive balance ($179 billion in 2011) was dwarfed by a negative balance in goods imports ($737 billion), for an aggregate U.S. trade deficit of $558 billion in 2011. Moreover, with U.S. exports of goods 157 percent greater than exports of services, one of the fastest ways to boost exports will be through expanding manufacturing. Helper, Krueger and Wial examined export growth rates for services, non-manufactured goods, and manufactured products (or combinations thereof) that would be required to balance the U.S. trade deficit over the next decade. He finds that to balance the trade deficit through increased services exports alone would require them to grow at an annual compound rate of 13.5 percent over the next decade, whereas their annual growth rate from 2000-2011 was 9 percent. To balance trade through increases in non-manufactured goods exports would require them to grow at a 23.7 percent rate over the next decade, whereas they grew at an 11.1 percent rate over the past decade. However, to balance trade by 2019 with only manufacturing exports, they would have to grow at a compound annual growth rate of 9.4 percent, compared to their growth rate of 6 percent over the prior decade. In other words, manufacturing has a "shorter road to hoe" in terms of the increase in exports required of it to balance the trade deficit. See Susan Helper, Timothy Krueger, and Howard Wial, *Why Does Manufacturing Matter? Which Manufacturing Matters?* (Washington, D.C.: Brookings Institution, 2012), http://www.brookings.edu/papers/2012/0222_manufacturing_helper_krueger_wial.aspx.
6. "Manufacturing Information," *Manufacturers Association of Central New York*, accessed February 22, 2012, http://macny.org/manufacturinginformation.aspx.
7. John M. Keynes, *The General Theory of Employment, Interest and Money* (London: Macmillan, 1936), 161-162.
8. U.S. Bureau of Labor Statistics.
9. Bureau of Labor Statistics, Current Employment Statistics (manufacturing employment, seasonally adjusted; accessed March 14, 2012), http://www.bls.gov/ces/; Census Bureau, Statistical Abstract of the United States: 1941(Washington, D.C.: 1942), http://www.census.gov/prod/www/abs/statab1901-1950.htm. Jobs figures are for January 2000 to December 2010, and 1929 to 1933. From 1929 to 1933, U.S manufacturing employment fell by 31 percent.
10. Bureau of Labor Statistics, (employment, hours, and earnings from the current employment statistics survey; accessed April 22, 2011).
11. Stephen J. Ezell and Robert D. Atkinson, *The Case for a National Manufacturing Strategy* (Washington, D.C.: ITIF, 2011), 29, http://www.itif.org/files/2011-national-manufacturing-strategy.pdf.
12. Bureau of Economic Analysis, Gross Domestic Product by Industry Accounts (real value-added by industry, value-added by industry; accessed March 3, 2012), http://www.bea.gov/iTable/index_industry.cfm.
13. Susan Houseman et al., "Offshoring and the State of American Manufacturing," (working paper, Upjohn Institute, 2010), http://www.upjohninst.org/publications/wp/10-166.pdf. Houseman et al. argues that the acceleration of imports from developing countries has imparted a significant bias to the official statistics. They contend that price declines associated with the shift to low-cost foreign suppliers generally are not captured in input cost and import price indexes.
14. Robert D. Atkinson, "The Race for Global Innovation Advantage and U.S. Economic Prospects," Keynote Address at U.S. Competitiveness: A New Conversation with New Opportunities Conference, March 10, 2011, http://www.itif.org/media/us-competitiveness-new-conversation-new-opportunities#video.
15. This 72 percent figure uses updated Bureau of Economic Analysis (BEA) value-added numbers. The official Bureau of Labor Statistics value-added productivity figures have not yet been updated with the new BEA data, and thus 2000-2010 manufacturing labor productivity growth is currently reported as 66 percent.
16. Mark J. Perry, "The Demise of America's Manufacturing Sector Has Been Greatly Exaggerated," Enterprise Blog, American Enterprise Institute, January 20, 2011, http://blog.american.com/2011/01/thedemise-of-america%E2%80%99s-manufacturing-sector-has-been-greatly-exaggerated/.
17. Bureau of Labor Statistics, Current Employment Statistics (manufacturing employment; accessed March 14, 2012), http://www.bls.gov/ces/.
18. U.S. Census Bureau, Manufacturing.
19. U.S. Census Bureau.
20. Bureau of Economic Analysis (chain-type quantity indexes for value added by industry; value added by industry; accessed January 18, 2012), http://www.bea.gov/industry/index.htm; World Bank, World Development Indicators (GDP growth, annual percent change; accessed January 18, 2012), http://data.worldbank.org/data-catalog/world-development-indicators; Taiwan National Statistics (gross domestic product by kind of activity; accessed January 18, 2012), http://eng.stat.gov.tw. Author's analysis.

21. Kevin S. Markle and Douglas A. Shackelford, "Cross-Country Comparisons of Corporate Income Taxes," (National Bureau of Economic Research, February 2011).
22. This assumes a USTR budget of $51 million and a U.S. defense and intelligence budget of $700 billion.
23. Vicki Needham, "White House creates new inter-agency trade enforcement panel," *The Hill,* February 28, 2012, http://thehill.com/blogs/on-the-money/1005-trade/212993-white-house-creates-new-trade-agency-.
24. Krehmeyer, Orsagh and Schacht, *Breaking the Short-Term Cycle*, (Business Roundtable Institute for Corporate Ethics and Centre for Financial Market Integrity, 2005), p. 1.
25. The White House, "President Obama's Plan to Win the Future by Investing in Advanced Manufacturing Technologies," p. 1, http://www.whitehouse.gov/sites/default/files/microsites/ostp/advanced-manu-fs.pdf.
26. Executive Office of the President, National Science and Technology Council, *A National Strategic Plan for Advanced Manufacturing*, February 2012, p. 5, http://www.whitehouse.gov/sites/default/files/microsites/ostp/iam_advancedmanufacturing_strategicplan_2012.pdf.
27. Fraunhofer Institute, "Fraunhofer Business Model," http://www.fraunhofer.de/en/about-fraunhofer/business-model.
28. Fraunhofer Institute, "Institutes and Research Establishments," http://www.fraunhofer.de/en/institutes-research-establishments.