Is the U.S. Losing Its Manufacturing Base?

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The Setup
Manufacturing output peaked in December 2007 and fell 20.8% over the following 18 months.
Manufacturing capacity utilization collapsed to the lowest rate in 70 years

Capacity utilization - manufacturing

percent

1990'91 '92 '93 '94 '95 '96 '97 '98 '99 '00 '01 '02 '03 '04 '05 '06 '07 '08 '09 '10 '11 '12 '13 '14

62 64 66 68 70 72 74 76 78 80 82 84 86
Job declines in the manufacturing sector were significant, with over 2.0 million jobs lost over that same period.
Is the U.S. Losing Its Manufacturing Base?
Manufacturing employment as a share of national employment has been declining for over 60 years.
The number of jobs in manufacturing has been relatively stable over this period, edging lower on average by -0.3% per year since 1947.
Not to make a mountain out of a molehill, but manufacturing employment was increasing up until 1979 and has been moving lower over the past 30 years.
However, service sector employment has grown more than fourfold over this period, averaging growth of 2.3% per year since 1947.
While manufacturing employment has been edging lower over the past 63 years, manufacturing output increased by 3.2% per year.
This translated into an almost 600 percent increase in manufacturing output over this time period.
The increase in output can be attributed to strong productivity growth experienced by the manufacturing sector.
What took 1,000 workers to produce in 1950 takes 167 workers today

Manufacturing sector:
Number of workers needed to do the work of 1,000 workers in 1950

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<tbody>
<tr>
<td>Workers</td>
<td>1,000</td>
<td>813</td>
<td>627</td>
<td>485</td>
<td>377</td>
<td>253</td>
<td>183</td>
<td>175</td>
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Manufacturing productivity has been growing faster over the past 40 years.
The divergence in productivity appears to have occurred around the mid-1970s.
This divergence is especially apparent in durable manufacturing.
Strong productivity growth had allowed the manufacturing sector to grow faster than the overall economy.
However, lower relative prices in the manufacturing sector has lead to manufacturing comprising a smaller share of GDP over time.
However, the US still makes over 70% of what it consumes

Value of US manufactured goods consumed by category (Billion USD)

From the Boston Consulting Group
How profitable is manufacturing?
While more cyclical, profits in manufacturing have out-performed returns in nonfinancial corporate businesses.
The Manufacturing Sector Continues to Re-invent Itself
Over the last twenty years the fastest growing sector, not surprisingly, has been computer and electronic components.

### Industrial output: 1990 - 2013

<table>
<thead>
<tr>
<th>Industry</th>
<th>Percent Change (Annual Rate)</th>
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<tbody>
<tr>
<td>Manufacturing Durable Goods</td>
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<td>Wood Products</td>
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<td>Nonmetallic Mineral Products</td>
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<td>Primary Metals</td>
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<td>Fabricated Metal Products</td>
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<td>Machinery</td>
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<td>Computer and Electronic Components</td>
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<td>Electrical Eqpt, Appliances &amp; Components</td>
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<td>Motor Vehicles and Parts</td>
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<td>Aerospace &amp; Miscellaneous Transport Equip</td>
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<tr>
<td>Furniture and Related Products</td>
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<tr>
<td>Miscellaneous Durable Goods</td>
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<tr>
<td>Nondurable Manufacturing</td>
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<td>Food, Beverages, and Tobacco</td>
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<tr>
<td>Textile and Product Mills</td>
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<tr>
<td>Apparel and Leather Goods</td>
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<tr>
<td>Paper</td>
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<tr>
<td>Printing and Related Support Activities</td>
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<tr>
<td>Chemicals</td>
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<tr>
<td>Petroleum and Coal Products</td>
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<tr>
<td>Plastics and Rubber Products</td>
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<tr>
<td>Other Manufacturing</td>
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There has been a large number of industrial sectors that have risen and fallen over the past twenty years.
The collapse in manufacturing experienced in 2008-2009 was closely linked with the economic recession.
Declines in manufacturing output were broad-based during the Great Recession – especially in vehicle and primary metals manufacturing.
The recovery has also been broad-based with motor vehicles and primary metals manufacturing leading the way.
Manufacturing workers have suffered steep employment declines over the current cycle.
But the overall economy’s employment growth also struggled.
When changes in nonfarm employment are considered, the most recent manufacturing employment downturn is not unprecedented.
The financial crisis and its aftermath has hampered the current economic expansion.
The recovery in manufacturing output is in-line with past industrial recoveries.
Productivity in the overall economy has grown at a rate below the low-end of previous expansions.
However, productivity within the manufacturing sector has grown at a somewhat faster pace.
Manufacturing employment losses have occurred across numerous countries – among 20 big economies, 22 million jobs were lost.
Is the U.S. positioned to continue its strong productivity gains?
U.S. maintaining its commitment to research and development

Research and development expenditures as a share of GDP

percent

1953 '58 '63 '68 '73 '78 '83 '88 '93 '98 '03 '08
The vast majority of U.S. research and development is being privately funded.
Lessons from the farm sector
We are producing more in our farm sector than at any time in our history

Real gross value added: farm business

Billions of chained 2005 dollars

140
120
100
80
60
40
20
0
1947  '57  '67  '77  '87  '97  '07
And we are accomplished this remarkable feat with less than 2.0% of our employment devoted to farming.
Trade with China
China has risen to number one in terms of U.S. imports, representing 19.4% of all imports in 2013.
While China has risen to be our third largest export country, it represents only 7.7% of U.S. exports.
This difference has led to China having the largest trade deficit with the U.S.
China has certainly increased the amount of goods flowing into the U.S.

Imports (customs value)

Index 1990=100
They have also represented the largest gain for exports from the U.S.
While China has increased its share of imports to the U.S., the Pacific Rim as a whole has had a declining share since the mid-90s.
U.S. share of world manufacturing steady for last 40 years

Manufacturing value added, % of world

- **US**: 25%
- **Japan**: 17%
- Rest of World: 58%

From the Boston Consulting Group
U.S. share of world manufacturing steady for last 40 years

Manufacturing value added, % of world

From the Boston Consulting Group
Energy
Adjusted for inflation, current oil prices are below the levels that existed thirty years ago.

Real West Texas Intermediate oil price
dollars per barrel, 2013 dollars
Natural gas prices are quite low

Real natural gas price

dollars per mmbtu, 2013 dollars
Due to technology that now allows access to reserves that have been known for quite a few years
Between 1994 and 2005 the natural gas to oil price ratio averaged 13.4% - year-to-date it has averaged 4.8% in 2014.
Implication: The U.S. is one of the world's lowest-cost countries for manufacturing

Major exporting nation average manufacturing cost structures relative to U.S. (2015 projections)

Manufacturing cost index (U.S. = 100)

From the Boston Consulting Group
The Current Expansion
Beginning in July 2009, manufacturing output in the United States has been increasing at a 4.8% annualized rate and as of May 2014 it finally regained all the output lost during the Great Recession.
Manufacturing capacity utilization has been rising since June 2009.
And while manufacturing jobs have been rising, they have only recovered 29.1% of the jobs lost during the downturn.
Summary

Manufacturing output is in the process of recovering its losses.
The success of manufacturing has been driven by productivity.
Manufacturing employment has shown little change over the past 70 years – with a steady decline over the past 30 years.
The most recent decline in manufacturing was cyclical, not structural.
Profits in manufacturing have outperformed profits for the rest of the nation.
The trends that have dominated manufacturing for the past 70 years are suggestive of the future for U.S. manufacturing: ever increasing output with employment representing a smaller share of total employment.