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Statement of

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Chairman Brown and members of the Economic Policy Subcommittee, I am pleased to share with you some perspectives on long-term trends in manufacturing and some observations about how the recent recession and recovery are affecting manufacturing. My name is William Strauss, and I am a Senior Economist and Economic Advisor for the Federal Reserve Bank of Chicago. The Chicago Federal Reserve District comprises parts of the states of Indiana, Illinois, Michigan, and Wisconsin, as well as all of Iowa. The Midwest economy was built upon the superior distribution channels that allowed manufacturing to become a vital part of the region. While the Midwest has been diversifying its economy over time, manufacturing remains one of the key industries that distinguishes our region from other regions of the country. My specialty is tracking the performance of the Midwest Economy, and in particular, the manufacturing sector. This information is shared within the Federal Reserve and helps provide an assessment on how the economy of this important region is performing. It also adds to the mosaic of information that policymakers need in order to craft the most appropriate monetary policy for the country.

I use a variety of tools to assist me in providing this insight into the performance of the manufacturing sector. I analyze the multitude of data, both government and private sector statistics that we as economists are fortunate to have available to us. In addition, I organize a series of industrial and manufacturing roundtables, held throughout the year, that brings together representatives from manufacturers and other key firms to discuss how conditions within their industry have changed over the recent period; to provide their outlook for their business; and to share any concerns that they might have about issues affecting their business.

In the early part of the past decade, there was great concern that we were losing our manufacturing base, and I proceeded to look at longer-term trends as a way of gauging whether

the losses in manufacturing were cyclical or structural. My conclusion at that time was that it was far more likely to be a cyclical rather than a structural issue facing the sector. While manufacturing output fell by 6.4 percent between September 2000 and November 2001, by May 2005 manufacturing output was at an all-time high, and by December 2007 manufacturing output in the United States was 11.4 percent higher than its previous peak.

Is U.S. manufacturing disappearing?

When discussing the health of the manufacturing sector one major issue is whether we should be taking into account the number of people employed in the sector or looking at the amount of output created in manufacturing. Interestingly, each leads to the opposite conclusion about the strength of manufacturing in the United States. Let us start off with employment.

Manufacturing employment as a share of total employment in the United States has been declining over the past 60 years. In 1950, nearly 31 percent of nonfarm workers were employed in manufacturing: this share has been declining at an average rate of 2 percent per year, falling to 28.4 percent in 1960, 25.1 percent in 1970, 20.7 percent in 1980, 16.2 percent in 1990, 13.1 percent in 2000, and 9.1 percent in 2009. Even with this downward trend in manufacturing's share of jobs, employment in manufacturing has on average been fairly stable over the past 60 years, averaging –0.1 percent per year. In contrast, the increase in nonfarm employment averaged 1.9 percent per year, and this led to the reduction in manufacturing's share of jobs. However, there is a break that occurs during this period. Between 1950 and 1979, manufacturing employment increased on average by 1.4 percent per year (over the same time period nonfarm employment was rising on average by 2.4 percent per year), and between 1980 and 2009, manufacturing employment declined on average by 1.6 percent per year (over the

same time nonfarm employment growth slowed, rising on average by 1.3 percent per year). In 2006, we had about as many workers in manufacturing as we had in 1950, just over 14 million workers. So looking at manufacturing employment leads one to believe that the sector is in decline or at best stagnant.

However, you get a very different conclusion if you focus on the amount of goods being produced by the manufacturing sector. While employment has changed very little over the past 60 years, output in manufacturing has increased at an annual rate of 3.4 percent. Manufacturing output in 2007 (the recent peak in manufacturing output) was over 600 percent higher than in 1950.

Productivity is the key.

So how was manufacturing able to see output surge over the past 60 years with little change in its employment? The answer can be found by looking at productivity. The increase in both the number of machines and the quality of the machines over time has allowed manufacturing sector output to rise. Productivity growth in the manufacturing sector has averaged 2.9 percent over the past 60 years. This means that because of improving efficiency in the manufacturing sector, output can rise each and every year by around 2.9 percent without the need to add any workers. What took 1,000 workers to produce in 1950 was able to be produced by 184 workers in 2009. Between 1950 and 1979, productivity growth in the manufacturing sector was matched by the productivity growth of the nonfarm economy--both averaged a rate of 2.5 percent each year. However, with the adaptation of CNC (Computer Numerical Control) manufacturing during late 1970s, productivity growth in the manufacturing sector increased. Productivity growth in the manufacturing sector increased to average 3.3 percent per year

between 1980 and 2009 while productivity growth in the nonfarm economy declined to average 2 percent per year over the same time period. Manufacturing output between 1950 and 1979 increased on average by 4.2 percent per year, and then between 1980 and 2009 manufacturing production growth slowed, averaging 2.2 percent per year. (Similarly, real gross domestic product (GDP) growth in the United States slowed down: Real GDP growth between 1950 and 1979 was 3.8 percent per year, and then between 1980 and 2009 real GDP growth slowed averaging 2.8 percent per year.) So over the past 30 years relatively slower manufacturing output growth and faster productivity growth led to a declining manufacturing labor force.

Between 1950 and 1979, productivity growth rates in both durable manufacturing and nondurable manufacturing were nearly identical, averaging 2.6 percent and 2.7 percent per year, respectively. However, between 1980 and 2009, productivity growth for durable manufacturing surged, to average 3.9 percent per year, and productivity growth for nondurable manufacturing declined, to average 2.4 percent per year. Durable goods manufacturing makes greater use of machinery, and it was clearly aided by the advancements in the capabilities of machines over this period.

Efficiency leads to lower prices.

Another interesting observation about manufacturing's long-term position in the U.S. economy is that, as stated previously, between 1950 and 2007 (prior to the severe recession) manufacturing output was just over 600 percent higher, while over the same period, growth in real GDP of the U.S. was a smaller 560 percent. Yet, the manufacturing share of GDP declined over this period. In 1950, the manufacturing share of the U.S. economy was 27 percent, and by 2007 it had fallen to 12.1 percent. How did a sector that experienced growth at a faster pace than

the overall economy become a smaller part of the overall economy? The answer again is productivity growth. The greater efficiency of the manufacturing sector afforded either a slower increase or an outright decline in the prices of this sector's goods. As one example, inflation (as measured by the Consumer Price Index) averaged 3.7 percent between 1980 and 2009, while at the same time the prices for new vehicles averaged 1.7 percent. So while the number of manufactured goods had been rising over time, their relative value compared with what other sectors had produced or provided did not keep pace. This allowed manufactured goods to be less costly to consumers and led to the manufacturing sector's declining share of GDP.

The rising tide of output does not lift all boats equally.

The rise in overall manufacturing has not translated into an increase in every manufacturing sector. One of the great strengths of the U.S. economy is its ability to "re-invent" itself over time. Industries that are experiencing rising demand are able to gain access to capital and labor, while those industries that are struggling are forced to either become more competitive or risk going out of business. This is the model of our economy that has allowed to U.S. to become the largest economy in the world.

Over the past 20 years, manufacturing output has risen on average by 2.2 percent per year, yet manufacturing's performance ranged from 15.0 percent growth per year for computer and electronic components manufacturing to –7.0 percent per year for apparel. The durable goods manufacturing sector output increased on average by 3.5 percent per year, while the nondurable goods manufacturing sector's increase was at a more tepid 0.4 percent per year.

The more intensive use of capital by the durable goods manufacturing sector has afforded its businesses the greater use of CNC manufacturing technology. Over the past 20 years,

productivity in the manufacturing sector increased by 96 percent, yet durable goods manufacturing productivity rose by 123 percent compared with 64 percent for nondurable goods manufacturing productivity.

Analyzing the current manufacturing downturn and recovery.

The recent recession had a very negative impact on the economy. Real GDP fell 4.1 percent between the second quarter 2008 and the second quarter of 2009--the largest drop in output since the 1930s. Employment declined by 6.1 percent during 2008 and 2009, representing nearly 8.4 million workers. Manufacturing output, which peaked in December 2007, fell 17.5 percent, bottoming in June 2009. With this severe loss of output, manufacturing jobs declined by 16 percent during 2008 and 2009. Over 2.1 million manufacturing workers lost their jobs, representing 26 percent of all job losses.

A greater loss in manufacturing during a recession is not unusual. Outsized reductions in manufacturing output and jobs are typically observed. For example, during the two previous post-World War II deep recessions, during the mid-1970s and early 1980s, real GDP declined 3.2 percent and 2.6 percent, respectively. During these two severe recessions, manufacturing output fell 15.7 percent and 11.6 percent, respectively. Even when the economic downturn is not too sharp for the overall economy, manufacturing tends to take a bigger hit. For example, during the recession of the early 1990s and 2001, real GDP declined by a fairly moderate 1.4 percent and 0.3 percent, yet manufacturing output fell by a more significant 3.8 percent and 6.4 percent, respectively.

Economic output began to expand in the third quarter of 2009, and over the past year output has risen 3.2 percent. However, a large part of the gain has been due to the inventory

cycle. The change in inventories has contributed 60 percent of the growth over the past year. The increase in real final sales (real GDP less the change in inventories) was a more reduced 1.2 percent over the past year. In contrast, manufacturing has experienced an extremely robust recovery, rising by 8.9 percent, and it has recovered 42.3 percent of the loss experienced during the recession. In fact, this year the manufacturing sector has added jobs each and every month, for a total of 136,000 jobs, representing nearly 1 out of every 4 (23 percent) private sector jobs created this year.

Industry cycles.

The 17.5 percent reduction experienced by the manufacturing sector was not equally shared among its subsectors. While all manufacturing industries experienced a decline, some were harder hit than others. The two industries most adversely affected during the recent recession were motor vehicles and parts and primary metals, whose output fell nearly 49 percent and 44 percent, respectively. Similarly, the 8.9 percent increase in manufacturing over the past year has not been equally distributed. For example, the two industries that have experienced the largest increases over the past year were the same industries that had been the hardest hit, motor vehicles and parts and primary metals, with gains of over 52 percent and 46 percent, respectively. These two industries are quite important to the Chicago Fed District. Our District produces around 30 percent of all the vehicles and over 30 percent of all the steel in the country. This has allowed the Chicago Fed Midwest Manufacturing Index to increase over the past year at a faster rate than the overall economy. While manufacturing output was 8.9 percent higher over the past year, manufacturing output in the Chicago District was 13.2 percent higher.

The U.S. appears to be positioned to continue experiencing strong productivity gains.

Since much of the gains in U.S. manufacturing have been due to strong productivity, a natural question to raise is whether these gains will continue into the future. Often we think that advancement in technology will lead to such productivity gains. Spending by the U.S. on research and development can be used as a proxy for the effort being devoted to new technology. On this front, the U.S. appears to be in relatively good shape as we continue to invest heavily in research and development. As a percent of our GDP, research and development has averaged 2.5 percent between 1953 and 2008. Between 1999 and 2008 it has averaged 2.7 percent, with 2008 at 2.8 percent.

The private sector has played an ever-increasing role in research and development spending. Fifty years ago the majority of research and development was being undertaken by the government. However, more recently, the private sector has taken over as the major spender for research and development. The privately funded share of research and development averaged 36 percent during the 1960s; 47 percent in the 1970s; 54 percent in the 1980s; 66 percent in the 1990s; and 72 percent between 2000 and 2008.

Every two years, Chicago hosts one of the premier manufacturing shows in the world, the International Manufacturing Technology Show (IMTS). It is breathtaking to see the cutting-edge technologies that are available to manufacturers. I typically ask exhibitors of more standard manufacturing equipment to explain to me the differences between the new equipment compared with what was displayed two years earlier. The response is almost universal: The new pieces of equipment are more accurate, faster, more versatile, and less expensive than their predecessors.

I often have the opportunity to tour manufacturing production facilities, and I am impressed by the continuous improvements in technology that companies employ. I always ask these producers the following question: Can they envision being able to be even more productive? Nearly all of the manufactures without hesitation tell me they absolutely can become even more efficient, and many then launch into a description of their near-term plans that will make them even more productive.

Back to the Future.

The transition that the manufacturing sector has been undertaking over the past 60 years is not the first time the U.S. has experienced an outsized increase in productivity driving output higher and employment lower. Something very similar has been taking place in the American agricultural industry over the past century.

In 1870, just over half of employment was dedicated to agriculture. Farm output today is higher than ever before (take, for instance, 2009 gross value added: farm business was over 400 percent higher than in 1950), yet we are able to produce all this output with only 1.6 percent of our employment dedicated to farming.

Conclusion.

The manufacturing sector remains a vibrant and innovative industry in the U.S. Manufacturing output has been rising at a solid pace over time, although it has been more affected by business cycle downturns than the overall economy. Most of this growth, especially over the past 30 years, has been achieved by improving productivity. This increase in productivity has been a double-edged sword. On the one side, increasing productivity has fostered a globally competitive sector with the ability to produce an ever-increasing amount of

goods with relatively lower price increases relative to the overall economy. On the other side, being more productive means that a producer can increase output without the need to add labor. If productivity is quite strong, the employer can actually achieve production goals using fewer workers.

The movements in output, productivity, and labor have not been occurring just over the past few years but have been taking place for decades. If the manufacturing sector follows the example offered by the agricultural sector, we can look forward to an industry that will continue to produce an ever-increasing amount of output, contributing to a stronger U.S. economy, with manufacturing employment representing a smaller share of the overall U.S. labor market.