Center for American Progress

Measuring Future U.S. Competitiveness

U.S. Productivity and Innovation Snapshot

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Introduction

Productivity growth—the rate at which we increase production with a given amount of work and resources—is critical to our national economic prosperity and competitiveness, and a factor tied closely to the pace of real investment. Investments in equipment and innovation lead to productivity growth, and productivity growth leads to long-run increases in our standard of living.

As the U.S. economy continues to pull out of the Great Recession, a number of trends point to clear signs of trouble for present and future U.S. competitiveness. First, investment continues at a slow pace, barely keeping up with capital depreciation. Second, the effects of slow investment can be seen in lagging productivity growth, which is below average for this point in a business cycle. Third, the U.S. high-tech trade deficit is widening once again.

Yet a number of ingredients for faster productivity growth in the future do show promise. This is true for private sector-led research-and-development spending, the number of newly trained Ph.Ds now being minted at our universities, and signs of recovery in the venture capital sector providing critical investment to early-stage innovation, especially for clean energy technologies.

The data presented here point to substantial challenges ahead to U.S. economic prosperity. The snapshot of U.S. productivity and competitiveness presented here shows that policymakers must give more attention to strengthening the factors that could lead to future productivity growth and rising living standards.

The numbers tell the tale

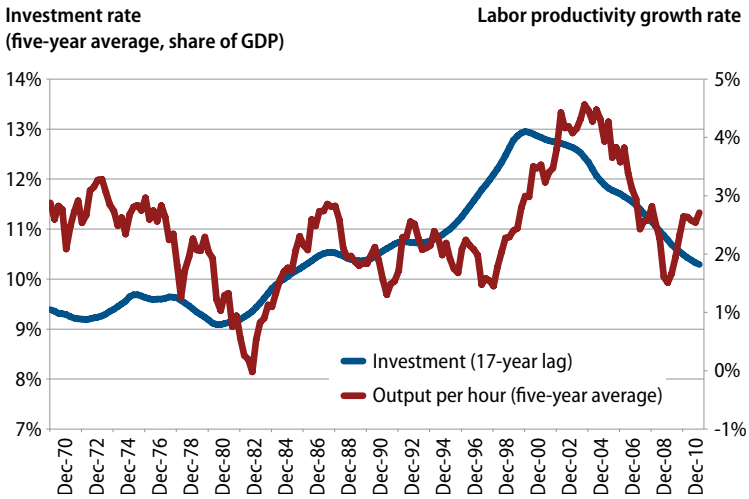
Investment drives productivity growth

Figure 1 depicts the long-run relationship between investment and productivity growth in the U.S. economy. The red line plots the five-year rolling average productivity growth rate. The blue line shows a five-year rolling average investment rate as a share of gross

domestic product, lagged 17 years. That is, any point on the horizontal axis shows the contemporary productivity growth and the investment rate from 17 years before. Lagging investment indicates a clear causal relationship: Investment leads to higher productivity growth in the long run.

U.S. productivity snapshot

Past investment (17-year lag) and current productivity growth



Source: Author's calculations of BEA and BLS data.

Investment is at the lowest level in four decades[1]

Business investment has averaged 10.3 percent of gross domestic product in this business cycle, from December 2007 to December 2010. This is the lowest average for any business cycle since the 1970s. Low investment is not due to the cost or availability of capital. Interest rates on corporate AAA bonds stand at just more than 5 percent, the lowest persistent interest rates since 1966.[2] And the nonfinancial business sector is holding more than $1.9 trillion in cash, totaling 7.4 percent of total corporate assets in the third quarter of 2010—the highest level since the fourth quarter of 1959.[3]

Investment is barely keeping pace with capital depreciation[4]

Net investment (investment minus depreciation) has averaged 1.5 percent of GDP in this business cycle, between December 2007 and December 2010. This is the lowest level since the 1940s and less than half of the next lowest average, 2.5 percent, that was recorded from March 2001 to December 2007.

Productivity growth lags behind previous business cycles[5]

Productivity growth typically increases during a recession and early in a recovery. Productivity growth for the first 12 quarters of this business cycle, from December 2007 to December 2010, totaled 7.6 percent, below the average of 8.5 percent for the previous eight business cycles lasting at least three years.

Domestic innovation is down[6]

The number of utility patents (patents granted for the invention of "new and useful" or material improvements of processes, machines, or materials) granted by the U.S. Patent and Trademark Office in 2009 did rebound from recession-year lows in 2008, jumping

6 percent to 167,349 patents granted in 2009. But even though patents overall were up, the share of patents granted to Americans continued a 15-year slide in 2009. In 1996, nearly 56 percent of patents granted were of U.S. origin. By 2008, this share dipped below 50 percent for the first time, and it stayed at 49 percent in 2009. Both Americans and foreigners can apply for patent rights under U.S. law.

High-tech trade balance deteriorates sharply[7]

The U.S. trade deficit in advanced technology goods worsened sharply in 2010 despite a lower dollar and increased overseas economic growth. Export growth of high-tech goods continued to be strong, up 7.2 percent in inflation-adjusted terms for the 12 months ending in November 2010. U.S. high-tech imports—already larger—were up 15.9 percent at the same time. The advanced technology trade deficit worsened to nearly $80 billion, or 38 percent larger than a year earlier. The high-tech trade deficit amounted to 13 percent of the overall U.S. trade deficit in the year through November 2010, the largest deficit since July 1998.

Meanwhile, the U.S. services trade surplus in research and development reversed its decline in 2009.[8] The surplus in net exports of research and development services eroded from $5.1 billion in 2000 to just $1 billion in 2008, but in 2009 expanded once again to $2.6 billion. Service trade typically consists of transactions between a corporate parent and its subsidiaries but this surplus nonetheless indicates the strength of critical R&D functions in the U.S. economy.

U.S. government R&D spending lags far behind private R&D spending[9]

Total inflation-adjusted R&D spending by the federal government increased from $353 billion in 2003 to $423 billion in 2008, the most recent year for which complete data are available. Private-business R&D spending comprised two-thirds of all R&D spending during this time and grew at an average annual rate of 4.5 percent through 2008. Federal government R&D spending grew at only 1.5 percent annually through 2008.

The United States lags behind other countries in R&D spending[10]

U.S. R&D spending amounted to 2.7 percent of GDP in 2007 (the most recent comparable year), ranking eighth in the world. Israel, Sweden, South Korea, Finland, Japan, Switzerland, and Iceland all dedicated a larger share of their economies to R&D investment. China, in comparison, dedicated 1.5 percent of its GDP to R&D and ranked 24th among all countries.

Growth of Ph.D.s wanes[11]

In 2009 American universities graduated more than 37,000 Ph.D.s, including more than 23,000 in science and engineering fields. But the pace at which universities graduated Ph.D.s fell off sharply, down 25 percent from 2008 and 39 percent from 2007, although the share of Ph.D.s in science and engineering remained constant. The waning graduation rate likely reflects delayed completion by Ph.D. candidates anticipating poor job prospects due to the Great Recession and related declining federal R&D funding and cuts to public university budgets, though it is also possible that a number of individuals left their programs for economic reasons. Over the past decade the United States graduated 485,487 Ph.D.s, of which the share in science and engineering fields increased by 6 percentage points. So while the dip in graduation rate is likely ephemeral, the population of doctorates is increasingly oriented towards science and innovation.

Venture capital comes back but remains well below pre-recession levels[12]

The pace of venture capital deals remains well below the pre-recession high. VC deals peaked in the four quarters through the first quarter of 2008 at 4,181, falling to a low of 2,916 in the four quarters through the end of 2009. Since then, the pace of VC deals has recovered steadily to a pace of 3,353 deals in the four quarters ending in the third quarter of 2010. This is still 19.8 percent below the level at the start of the recession.

Clean tech receives particular attention from venture capital investors[13]

The number of VC deals in clean technology more than tripled, from 81 in 2005 to 279 in 2008. The number of clean-tech deals fell to 193 in 2009, before regaining momentum in 2010, totaling 262 in the four quarters through the third quarter of 2010.

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Endnotes

1 Bureau of Economic Analysis, *National Income and Product Accounts* (Department of Commerce, 2010), table 1.1.1. Interest rates from: "Federal Reserve Statistical Release H.15 - Selected Interest Rates; Historical Data," available at http://www.federalreserve.gov/releases/h15/data.htm. Cash holdings from: "Federal Reserve Statistical Release Z.1 - Flow of Funds Accounts of the United States," available at http://federalreserve.gov/releases/z1/Current/accessible/default.htm.

2 "Federal Reserve Statistical Release H.15 - Selected Interest Rates; Historical Data," available at http://www.federalreserve.gov/releases/h15/data.htm.

3 "Federal Reserve Statistical Release Z.1 - Flow of Funds Accounts of the United States; Release Dates," available at http://www.federalreserve.gov/releases/z1/.

4 Bureau of Economic Analysis, *National Income and Product Accounts* (Department of Commerce, 2010), tables 1.1.5, 5.1.1, and 5.2.

5 "Labor Productivity and Costs," available at http://bls.gov/lpc/.

6 "U.S. Patent Statistics Summary Table, Calendar Years 1963 to 2009," available at http://www.uspto.gov/web/offices/ac/ido/oeip/taf/us_stat.htm.

7 "U.S. Trade Balance with Advance Technology Products," available at http://www.census.gov/foreign-trade/balance/c0007.html#1989-trade/balance/c0007.html; adjusted for inflation with: "Import/Export Price Indexes (MXP)," available at http://bls.gov/mxp/.

8 "Table 1. Trade in Services, 1992-2009," available at http://bea.gov/international/xls/tab1a.xls; adjusted for inflation using price indices from: Bureau of Economic Analysis, *National Income and Product Accounts* (Department of Commerce, 2010), table 4.2.4.

9 "Science and Engineering Indicators: 2010," Table 4-1, available at http://www.nsf.gov/statistics/seind10/tables.htm.

10 "Science and Engineering Indicators: 2010," Table 4-11, available at http://www.nsf.gov/statistics/seind10/tables.htm.

11 "Integrated Science and Engineering Resources Data System," available at https://webcaspar.nsf.gov/OlapBuilder.

12 "Latest Industry Statistics," available at http://nvca.org/index.php?option=com_content&view=article&id=78&Itemid=102.

13 Ibid.