

WHERE JOBS COME FROM

THE ROLE OF INNOVATION, INVESTMENT, AND INFRASTRUCTURE IN ECONOMIC AND JOB GROWTH

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EXECUTIVE SUMMARY

As we move out of the Great Recession and into 2010, the key to a successful economic recovery is robust job creation. While the need to create jobs is obvious, the policies that will get us there are not. President Obama has made job creation our nation's number one priority. To get there we need to first understand the conditions that foster job growth. Our research finds:

- **The lack of job creation – more than job losses – is at the heart of the current unemployment challenge.**

The job outlook is far better than it would have been without the Obama administration's efforts – but the President is right to insist that more needs to be done. He inherited an economy that was underperforming on jobs even before the financial crisis. Under President Clinton, the economy added 21 million net new jobs, or more than 2.6 million net new jobs each year. But under President Bush's stewardship, average job growth dropped to less than half that even before the current recession's 7 million job losses. That means we need to create roughly 18 million new jobs just to return to the path we were on when Clinton left office.

- **Small businesses and young startups are the primary creators of new jobs.**

Everyone by now has heard that small businesses are the big engines of job creation. In 2007, over 50 percent of new jobs created came from firms with fewer than 50 employees. Even more remarkable, nearly two-thirds of new jobs in 2007 were generated by businesses between 1 and 5 years old.

- **Job creation is closely tied to business investment. To promote a sustainable recovery and to create jobs we need to create an economic climate for businesses to invest and innovate again.**

Low levels of job creation this decade can be directly linked to historically low levels of investment. New research, which we cite below, finds that investment recovered within a year and a half of the seven recessions prior to 2001. After the 2001 recession, however, it never fully recovered proving that to create jobs we need to encourage a climate of investment and innovation again.

To address these findings we propose the following policy recommendations:

- **Enact President Obama's Proposed Small Business Relief Package.**

Congress should enact President Obama's proposed Small Business Jobs and Wages Tax Credit and the president's proposal to transfer \$30 billion from the Troubled Asset Relief Program (TARP) to a new Small Business Lending Fund. We need to get credit back into the hands of small businesses, and the best way to do that is to extend credit to the institutions that directly finance small businesses. We should help small businesses hire the workers they would like to hire today, but until now have been unable to because of a lack of resources.

- **Simplify the R&D Tax Credit, and Make it Permanent.**

We should make the R&D Tax Credit permanent, allowing small businesses to budget for long-term innovative projects including hiring salaried workers. We should also level the playing field, requiring all firms to calculate their benefit using the same simple formula, the Alternative Simplified Credit, which is more generous to small businesses and young firms.

- **Establish an American Investment Bank.**

We support the president's proposed \$4 billion dollar National Infrastructure Innovation & Finance Fund and recommend the fund be used to stake an American Investment Bank, modeled on the European Investment Bank.

INTRODUCTION

Without question, President Obama inherited the most treacherous economic situation of any president since Franklin Roosevelt. Upon his inauguration, the nation's financial system was on the verge of a complete meltdown. During the course of the Bush administration, average income had fallen, poverty had risen, and the percentage of Americans with health coverage had dropped dramatically.¹

The administration's efforts have already paid off. For example, without the stimulus of the president's recovery bill, the drop-off in real GDP growth would have been 2 percent lower than what it was at the end of the year, the economy would have lost up to 2 million additional jobs, and the decline in the nation's funding for research and development would have been nearly *triple* what it was.² Already, stimulus funds created 640,000 new jobs that would not have existed but for the recovery bill.³ So today, even as many Americans continue to suffer through economic hardship, we know that things are much better than they might have been without the quick action of the administration's new economic team.

However, we cannot minimize how much work remains to be done. Joblessness persists. Even as other indicators of the economy's health have begun to rebound, too many Americans eager and prepared to work are unable to find jobs. The unemployment rate has doubled since the beginning of the recession. And as the President has made clear, sparking job growth is his administration's top priority.

While the public's concern frequently focuses on job losses, there is growing research that another factor is playing an even more important role: the lack of job creation.

The economy has lost over 7 million jobs since the start of the recession in December 2007. But the decline in new job creation began at a much earlier point during the Bush administration. From 1993 through the end of 2000, under President Clinton the economy added 21 million net new jobs. On aver-

¹ McKay, Conor, "The Lost Decade," Democratic Leadership Council, January 2010.

² Council of Economic Advisors, "The Economic Impact of the American Recovery and Reinvestment Act of 2009," Second Quarterly Report, 13 January 2010, and Milano, Jessica and Marc Dunkelman. "Brain Freeze: The Downturn's Impact on R&D and What We Can Do About It," Democratic Leadership Council, October 2009.

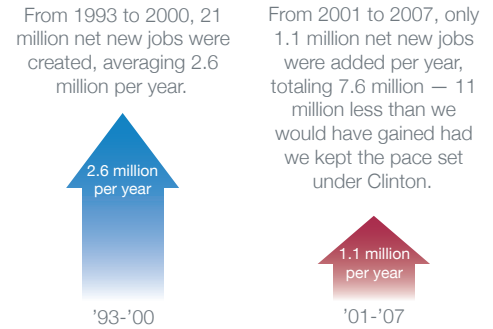
³ Council of Economic Advisors, "The Economic Impact of the American Recovery and Reinvestment Act of 2009," Second Quarterly Report, 13 January 2010.

age, that amounts to more than 2.6 million net new jobs each year.⁴

But this decade has seen less than half that growth even before the recession. From 2001 to 2007, average job growth dropped to 1.1 million net new jobs annually. That meant that even before the current recession the economy would need to add 11 million new jobs over the coming years just to reach where we would have been had we kept the pace set under President Clinton. Combined with recent job losses and the number today is more like 18 million.⁵

The report that follows is meant to first hone our understanding of how America’s employment has evolved over the last decade – what has happened to make it more difficult for Americans to find jobs? Second, we aim to find where, within the American economy, we are most likely to expand the number of job opportunities. And third, we ask what we can do to spark growth in the nation’s job market.

FIGURE 1: NET NEW JOBS ADDED PER YEAR, 1993-2000 vs. 2001-2007



Source: US Census Bureau, Longitudinal Business Database 1993-2007

FINDING 1: A LACK OF JOB *GROWTH*— NOT JUST RECENT LAYOFFS — LIES AT THE ROOT OF THE NATION’S UNEMPLOYMENT CHALLENGE.

Conventional wisdom holds that high unemployment during recessions is driven by business layoffs. Job loss numbers have dominated the headlines. But while layoffs have been an important factor, they are only a part of the unemployment problem. Each and every day, in a dynamic economy like ours, thousands of workers leave jobs and others start new ones. As new workers enter the job market, either because they have lost a job, just earned a degree, or decided to return following an absence, the rate at which new jobs are being created will frequently determine their success. At the core, the most important factor facing those looking for a job is the difference at any moment between the rate at which jobs are being lost and the rate at which new ones are being created.

During the Great Recession, job losses have paled in comparison to the decline in the number of new jobs that are not being created.

Recent research shows that the rate of job creation is a far more important factor in high unemployment rates than previously thought. In the previous three recessions (1981-1982, 1990-1991, and 2001), job losses never amounted to more than a third of the increase in total unemployment.⁶ During the Great

⁴ Based on US Census Bureau jobs data from the Longitudinal Business Database. Job creation statistics can also be compiled using employment data, such as that gathered by the Bureau of Labor Statistics. As such, the data presented here may differ slightly from job creation data in other reports.

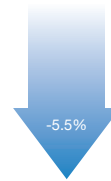
⁵ Average 2,640,474 net new jobs per year from 1993-2000 versus 1,087,655 net new jobs per year from 2001-2007. The 7-year deficit in job growth for 2001-2007 is therefore 10,869,733 net new jobs, US Census Bureau Longitudinal Business Database.

⁶ Sherk, James. “Why Job Creation Matters More than Job Losses,” The Heritage Foundation, August

*FIGURE 2: JOB GROWTH
VERSUS JOB LOSS, 2008Q1-
2009Q1*

Average quarterly
change in total
private job gains,
2008Q1-2009Q1

Average quarterly
change in total
private job losses,
2008Q1-2009Q1



QUARTER	TOTAL PRIVATE GROSS JOB GAINS	QUARTELY CHANGE	TOTAL PRIVATE GROSS JOB LOSSES	QUARTELY CHANGE
2008Q1	7,167,000	-6.6%	7,447,000	1.2%
2008Q2	7,296,000	1.8%	7,832,000	5.2%
2008Q3	6,884,000	-5.7%	7,851,000	0.2%
2008Q4	6,738,000	-2.1%	8,539,000	8.8%
2009Q1	5,746,000	-14.7%	8,486,000	-0.6%
Avg.		-5.5%		3.0%

Source: BLS Business Employment Dynamics, <http://www.bls.gov/bdm/>

Recession, officially begun in December 2007, job losses have paled in comparison to the decline in the number of new jobs that are not being created – underscoring that job losses, per se, are not the biggest contributor to unemployment rates this time around either.

The good news is that, thanks in part to the recovery package, job loss is slowing. The Bureau of Labor Statistics’ (BLS) Business Employment Dynamics reveal job losses have leveled off. The latest data available for first quarter 2009 largely mirrored the previous quarter’s numbers at 8.5 million. The bad news is we have not begun to create the number of new jobs needed to turn things around. The number of new jobs created fell 15 percent at the start of 2009 – the lowest level since BLS began tracking the series in 1992.

FINDING 2: SMALL BUSINESSES ARE A KEY SOURCE OF NEW JOBS.

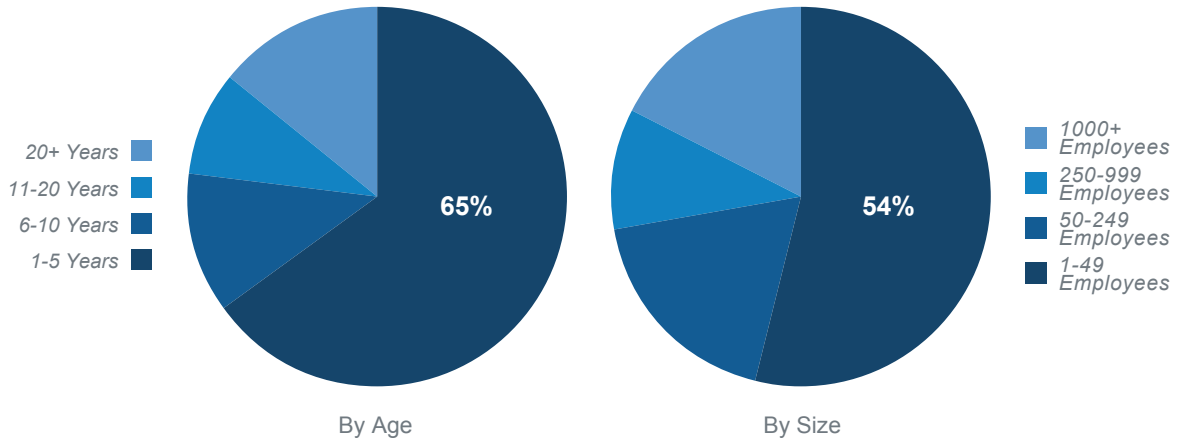
In 2007, over 50 percent of new jobs created came from small businesses, namely those with fewer than fifty employees. Even more remarkable, a new report from the Kauffman Foundation based on soon-to-be-released Census data found that nearly two-thirds of new jobs in 2007 were generated by businesses between 1 and 5 years old.⁷

Entrepreneurs and innovators are the backbone of our economy. But, in the current economic climate, they have not yet been able to create jobs at the rate necessary to offset the nation’s job losses.

2009. See also, Robert Hall, “Job Loss, Job Finding, and Unemployment in the U.S. Economy over the Past Fifty Years,” *Macroeconomics Annual 2005*, National Bureau of Economic Research, and Michael Elsby, Ryan Michaels, and Gary Solon, “The Ins and Outs of Cyclical Unemployment,” NBER Working Paper No. W12853, January 2007.

⁷ Stangler, Dane and Robert Litan. “Where will the jobs come from?,” Kauffman Foundation, 5 November 2009.

FIGURE 3: JOB CREATION BY FIRM BY AGE AND SIZE



Source: BLS Business Employment Dynamics series and Kauffman Foundation report, "Where will the jobs come from?," November 5, 2009.

One factor holding back small business growth and job creation is the heightened cost of credit and the difficulty they have securing loans.

In 2007, over 50 percent of new jobs created came from small businesses, namely those with fewer than fifty employees.

Community banks are the lifeblood of small business lending. America’s largest corporations get just 30 percent of their financing from banks, benefiting from the fact that they have access to capital markets and other sources of funding. But small businesses rely on banks for 90 percent of their financing needs.⁸

Unfortunately, the banks’ initial reaction to the crisis was to reduce lending drastically. Exposed to a record number of bad loans, they tightened their underwriting standards on new loans to avoid further losses. Less than one year into the recession, 80 percent of senior loan officers surveyed by the Federal Reserve reported tightening standards on commercial loans.⁹

Even the largest banks that received federal bailout money had trouble increasing lending. Wells Fargo and Bank of America, the two biggest small-business lenders, cut their lending by 4.4 percent and 6.2 percent, respectively, from April to November 2009.¹⁰ In total, the 22 largest bank recipients of bailout money reduced their small business lending by \$12.5 billion during the same period, according to Treasury Department data.¹¹ Without available credit, small businesses will continue to struggle and job creation will lag. That is why the President’s plan to transfer \$30 billion of Troubled Asset Relief Program (TARP) funds to a new Small Business Lending Fund is so crucial. The new fund would support the small and mid-size community banks that make the lion’s share of small business lending.

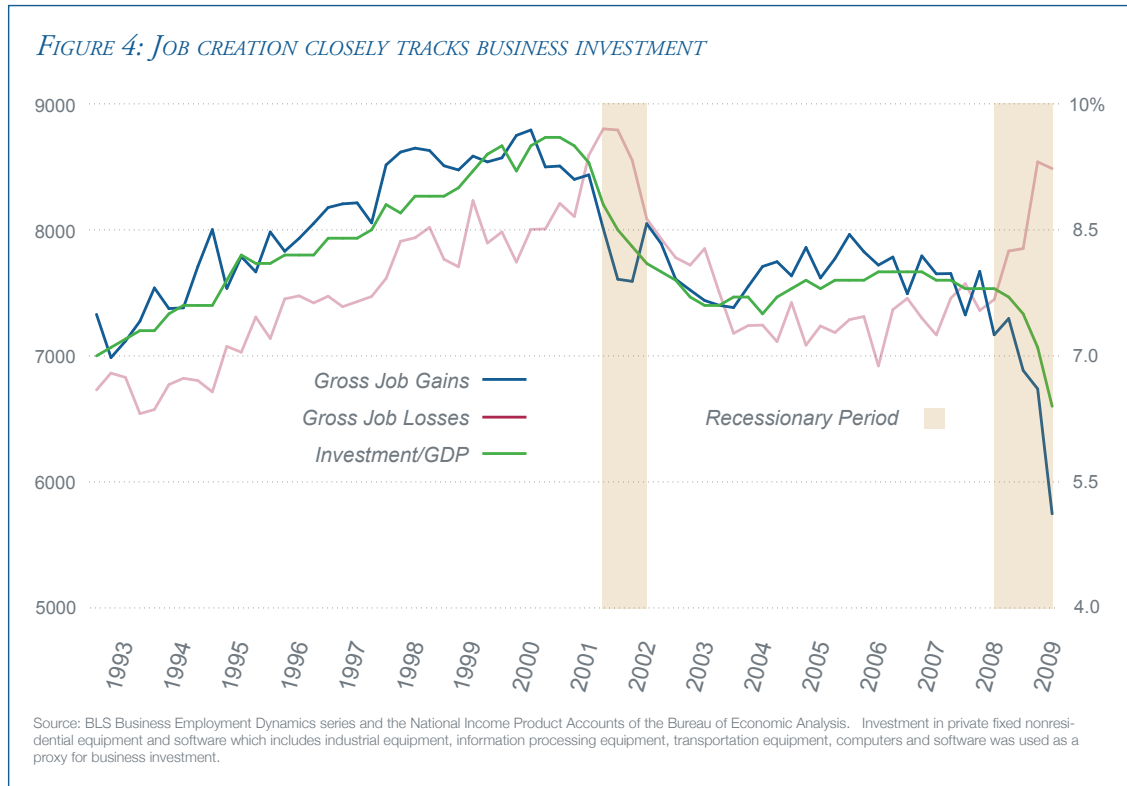
⁸ “Small business, big problem,” *The Economist*, 10 December 2009.

⁹ The Federal Reserve Board, Senior Loan Officer Opinion Survey on Bank Lending Practices, October 2009.

¹⁰ Martin, Andrew. “The Places They Go When Banks Say No,” *The New York Times*, 30 January 2010.

¹¹ Ibid.

FINDING 3: JOB CREATION IS CLOSELY TIED TO BUSINESS INVESTMENT



While it may seem intuitive that job creation closely tracks business investment, scholars within the economic community have long debated whether investment or consumer demand for new goods spurs job creation. New data should end the myth that there is a trade-off between short-term and long-term economic growth embodied by the consumption versus investment debate. We find that businesses invest in capital and labor concurrently, and so, in the long run, economic growth and job creation go hand and in hand. We also find that the Bush administration’s attempt to stimulate consumption through tax cuts created a short-term bubble rather than new job growth.

Following the end of the small recession of 2001, the American economy never returned to the investment and job creation levels that characterized the Clinton years.

As the chart above shows, investment by businesses in equipment, software, and computers has closely tracked new job creation over the last two decades. This relationship holds true during periods of recession and periods of growth.

However, Figure 4 offers another interesting finding: Following the end of the small recession of 2001, the American economy never returned to the investment and job creation levels that characterized

the Clinton years. In fact, investment levels during the reign of the Bush administration were well below historical averages. According to BLS research, “Eighteen months into the recoveries of the previous seven recessions [to 2001], real gross private investment is an average of 10.0 percent higher than its peak level. Eighteen months into the [2001 recession] recovery, real gross private investment is 4.9 percent lower than its peak level.”¹² Job gains also remain lower than historical averages after the 2001 recession.

To avoid losing our competitive edge in many of the new industries that will drive economic growth around the world in the next generation, we need to do the hard work of preparing for tomorrow.

What accounts for this lower investment and job creation? In its simplest form, economic growth is based on three factors: consumption, investment, and net exports. The Bush administration’s short-term tax stimulus after the 2001 recession spurred consumption demand, but did little to encourage investment. Along with the tax cuts and cheap credit from the Federal Reserve, higher housing values empowered Americans to spend beyond their real means. This kind of spending (consumption) temporarily increased output as businesses rushed to meet consumers’ demands for new things to buy. But when it was over, our nation was left with debilitating levels of debt, reflected nationally by the federal deficit, but also in homes across the country where families struggled to pay off credit card and mortgage debt.

The short-term growth that characterized the Bush years is not sustainable. It might be termed as a sort of bubble. Bubbles are not just bad because, when they burst, they leave recessions in their wake; they are also bad because they tend to take us off the path of sustainable long-term growth. We are so busy producing and buying what we want today we fail to make the necessary investments in the innovations and technologies that will create jobs and raise our incomes in the future. In fact, a report from the President’s National Economic Council found that “between 2000 and 2007 the typical working-age household saw their income decline by nearly \$2,000.”¹³

It is time for America to stop looking for short cuts. To avoid losing our competitive edge in many of the new industries that will drive economic growth around the world in the next generation, we need to do the hard work of preparing for tomorrow. We need to shift our focus from consumption-driven growth to long-term investment in broadband and wireless infrastructure, information technology, new energy technologies, smart grids and high speed transportation. Given the decline in housing values and personal savings, there is ample reason to believe that consumption will play a much smaller role in the recovery this time around and investment will have a chance to be the real driver of sustainable, long-term growth.

¹² Faberman, R. Jason, “Gross Job Flows over the Past Two Business Cycles: Not all ‘Recoveries’ are Created Equal,” BLS Working Paper 372, June 2004.

¹³ “A Strategy for American Innovation: Driving Towards Sustainable Growth and Quality Jobs,” National Economic Council, Office of Science and Technology Policy, September 2009.

INVESTING IN INNOVATION AND INFRASTRUCTURE CAN CREATE JOBS

It is clear job creation is central to reducing unemployment, young firms and small businesses are the primary creators of jobs, and investment is a key predictor of job creation. In light of these three findings, Washington needs to build a policy agenda that encourages investment and makes it easier for small businesses to access credit to grow. Two areas where policy can directly impact investment are innovation and infrastructure.

INNOVATION

Innovation is a vital driver of economic growth.¹⁴ Research and development (R&D) accounted for 7 percent of real GDP growth between 1995 and 2004.¹⁵ But R&D has been severely impacted by the recession. A recent DLC study found that real R&D spending (adjusted for inflation) has dropped by 2.4 percent since the start of the recession, marking only the third time in the last 30 years that real R&D growth has been negative. Moreover, had the Obama administration not pumped in additional federal stimulus investment, the decline would have been much worse, possibly as large as 7.4 percent.¹⁶

While R&D jobs are frequently highly specialized and technical, new industries and technologies can have a wide reaching impact – just look at the response to the debut of the iPhone. In less than three years, more than 43 million iPhones have been sold, more than 1 billion mobile apps have been downloaded, mobile apps stores sprang into existence for the first time as an entirely new distribution channel for mobile content, and mobile device manufacturers rushed to develop competing devices such as the Palm Pre and the Google G1 handset by HTC.¹⁷ AT&T, the iPhone's U.S. carrier, has invested approximately \$55 billion in its wireless and wireline networks since 2007.¹⁸

Innovators, entrepreneurs, and small businesses create up to two-thirds of new jobs annually, but they have also been hit hard by the recession. As discussed above, small businesses rely on community banks for 90 percent of their financing needs. And community banks are reeling: 174 have failed since the start of the recession and those that have survived have reduced lending drastically.¹⁹ As the economy recovers so should community bank lending. But perhaps the lesson learned from the crisis is that small businesses can benefit from having access to diverse sources of funding as well.

INFRASTRUCTURE

Investment in infrastructure projects can boost our global competitiveness and create jobs at

¹⁴ For discussion of endogenous growth theory see Romer (1987, 1990), Aghion and Howitt (1992), Grossman and Helpman (1991, Ch 3, 4), and Barro and Sala-i-Martin (1995, Ch 6, 7).

¹⁵ "Research and Development Bolsters U.S. Economic Growth," National Science Foundation Press Release 07-129, 1 October 2007.

¹⁶ Milano, Jessica and Marc Dunkelman. "Brain Freeze: The Downturn's Impact on R&D and What We Can Do About It," Democratic Leadership Council, October 2009.

¹⁷ "Smart-phone Wars," *The Economist*, 13 June 2009.

¹⁸ AT&T, Investor Briefing, No. 267, 4th Quarter 2009, 28 January 2010.

¹⁹ As of 29 January 2010.

the same time. Several studies have pointed to a positive correlation between infrastructure investment and economic growth. In particular, “spending on infrastructure benefits the economy by reducing the cost of private business transactions.”²⁰ Efficient networks are the lubricant that keeps the economy moving and helps U.S. businesses compete in a fast-changing global marketplace.

Since infrastructure investment benefits the economy as a whole even more than it benefits individual investors, it is sometimes referred to as a public good, and there is a long tradition of government support for this kind of investment. Highways are a classic example. But it is misguided to assume that, because there is a public benefit, government alone can or should do the work. The major infrastructure challenges of the 21st century economy will require private sector investment, public-private partnerships, and public support to build the NextGen air traffic control systems, smart electrical grids, faster broadband connections, and high-speed rail services of the future.

TRANSPORTATION

Our nation’s physical infrastructure is failing. The American Society of Civil Engineers (ASCE) grades it a ‘D’ and estimates the United States will need to raise \$2.2 trillion just to repair and maintain our existing infrastructure stock.²¹ At the same time, we are being outspent by our competitors. The United States spends about 2 percent of GDP per year on infrastructure investment (this includes federal, state and local, and private sector spending) compared to about 5 percent in Europe and 9 percent in China.²²

And the demand on our rail, roads, ports, and air is growing. By 2020, U.S. freight volumes are expected to be 70 percent greater than in 1998. Road congestion costs \$78 billion annually, driven by 4.8 billion hours of delay and 2.8 billion gallons of wasted fuel. And flight delays add up to an additional \$15 billion of lost productivity annually.²³

Over \$8 trillion of goods are moved by freight annually in the United States and three-quarters of this traffic is by trucks on interstate highways.²⁴ The Federal Highway Administration estimates \$1 billion in federal funds, augmented by a 25 percent state-by-state match, creates 34,779 jobs economy-wide.²⁵

Investing in next generation air traffic control can ease congestion and handle more flights with more efficient routes through airspace. Switching from ground-based radar surveillance to a more accurate satellite-based surveillance technology would allow planes to fly more direct routes and circumnavigate weather more effectively, increasing capacity while reducing delays. According to the NextGen Joint Planning and Development Office, there are “more than 5,400 under-used rural or suburban airports in the U.S. and 98 percent of the population lives within 30 minutes of one.”²⁶

²⁰ Congressional Budget Office, Issues and Options in Infrastructure Investment, May 2008.

²¹ American Society of Civil Engineers, Report Card for America’s Infrastructure, <<http://www.infrastructurereportcard.org/>>

²² “The cracks are showing,” The Economist, 26 June 2008.

²³ Ibid.

²⁴ Research and Innovative Technology Administration, Bureau of Transportation Statistics, <http://www.bts.gov/programs/freight_transportation/>

²⁵ Levine, Linda. “Job Loss and Infrastructure Job Creation Spending During the Recession,” Congressional Research Service, 2 October 2009.

²⁶ “The Next Generation Air Transportation System: Think Globally, Act Locally,” NextGen Joint Planning and Development Office, May 2006.

The primary reason that these airports are underutilized is that they lack control towers or radar. By putting satellite technology in the cockpits of planes, we can make smaller airports more accessible, taking the pressure off busy hubs and opening up more communities to commercial air travel. According to one recent study, investing in NextGen has the potential to create up to 80 direct jobs for every \$1 million invested.²⁷

High-speed rail is another way to reduce air and road congestion in densely populated economic corridors that are highly trafficked. Amtrak's first foray into high-speed rail has been a resounding success. The Acela Express train has captured 50 percent of the air and rail commuter market between Washington, DC and New York and 75 percent of the market for intermediate cities Baltimore and Philadelphia.²⁸ Other locations in the United States suited to high-speed rail include California (Los Angeles – San Francisco), Florida (Tampa – Orlando – Miami), Texas (San Antonio – Houston – Dallas), and the struggling Midwest (Minneapolis – Chicago – St. Louis – Detroit). And high-speed rail creates jobs – \$10 billion invested in high-speed rail creates 40,000 direct construction-related jobs and 112,500 indirect jobs.²⁹

FASTER BROADBAND

Investment in information and communication technologies (ICT) like broadband contributed almost 1 percent (0.8%) to average annual real GDP growth in the United States from 1994 to 2000.³⁰ We need this kind of growth again to drive a strong recovery.

Several studies have shown that fast, reliable broadband investment improves the operational efficiency of businesses, making it easier for them to reach new markets, grow their business, and hire additional employees. This is particularly important for small businesses or for businesses in small communities. High-speed Internet services are integral to any firm intent on processing large volume transactions efficiently. Already, many manufacturers require suppliers to be capable of exchanging orders electronically. Broadband access also enables small businesses to build websites that advertise their services in the fast, interactive, and reliable format consumers have come to expect visiting the large online retailer websites. In this way, it can be an important tool to help level the playing field between large and small businesses and between urban and rural communities.

In fact, a new study using data from 1999 to 2006 reveals that communities with new access to broadband experienced 6.4 percent higher employment growth on average than before they had broadband. Rural communities benefited more than major cities by gaining access to larger markets for the first time. And workers with computer skills saw the greatest job growth overall. Administrative and business support services saw 14 percent employment growth, while company managers saw a whopping 40 percent employment growth.³¹

²⁷ "Equipping Aircraft Will Create Jobs and Achieve Environmental and Safety Benefits Now," Air Transport Association, <<http://www.airlines.org>>

²⁸ Black, R. Clifford. "Acela Express," Japan Railway & Transport Review, March 2005.

²⁹ Weinstein, Paul. "Putting America's Transportation System Back on Track," Memos to the Next President, Progressive Policy Institute, January 2009.

³⁰ Bureau of Economic Analysis, Gross Domestic Product by Industry Accounts, <<http://www.bea.gov/industry/gpotables/>>

³¹ Kolko, Jed. "Does Broadband Boost Local Economic Development?," Public Policy Institute of California, January 2010.

Job creation was also strongest in the industries that utilized information technology and had the most to gain from faster internet connectivity. Industries such as Information; Finance and Insurance; Professional, Scientific, and Technical Services; and Utilities saw employment growth ranging from 12 to 16 percent.³² Given this evidence, there is enormous potential for job creation if we expand broadband deployment and upgrade existing infrastructure. A Brookings study found that for every 3 million new lines deployed, nearly 300,000 economy-wide jobs are created.³³ Separate research has shown small businesses, the drivers of job creation and biggest beneficiaries of faster networks, hire 40 percent of the high tech workforce of scientists, engineers, and computer programmers.³⁴

SMART GRIDS AND CLEAN ENERGY NETWORKS

Devoting additional investment to renewable energy technologies such as solar and wind power would create jobs while simultaneously reducing our environmental impact and providing consumer savings.

Wind is the fastest growing energy source in the United States. In 2007, wind energy production increased by 21 percent, and a recent report by the U.S. Department of Energy suggests that it could contribute 20 percent of the nation's electricity by 2030. To get there, the nation would have to expand the number of turbine installations from 2,000 per year in 2006 to 7,000 per year by 2017.³⁵ The same Department of Energy report found that such an effort would drive the creation of over 250,000 economy-wide new jobs each year, including over 70,000 direct jobs in the construction of turbines and the manufacturing of turbine parts.

While the technology of wind electricity is relatively new, the manufacturing base for its production is very similar to past products. Each state has small businesses and laborers with experience making products similar to the blades, gearboxes, brakes, hubs, cooling fans, couplings, drives, cases, bearings, generators, towers, and sensors that comprise a wind tower. These jobs fall into the familiar durable manufacturing sectors of plastics and rubber, primary metals, fabricated metal products, machinery, computer and electronic products, and electrical equipment.

Solar energy is an area where the U.S. is rapidly losing its lead. Foreign competition is so stiff that we may soon lose the ability to manufacture the next generation solar technologies. According to Energy Secretary Steven Chu in testimony to the U.S. Senate earlier this year, the US "manufactured more than 40% of the world's solar cells as recently as the mid 1990s [but] today, we produce just 7 percent."³⁶

³² Ibid.

³³ Crandall, Lehr, and Litan, "The Effects of Broadband Deployment on Output and Employment: A Cross-sectional Analysis of U.S. Data," The Brookings Institution, July 2007.

³⁴ Testimony of The Honorable Lawrence E. Strickling, Assistant Secretary for Communications and Information, National Telecommunications and Information Administration, United States Department of Commerce, Before the Committee on Small Business, United States House of Representatives, Hearing on The Recovery Act and Broadband: Evaluation of Broadband Investments on Small Businesses and Job Creation, 28 October 2009.

³⁵ "20% Wind Energy by 2030: Increasing Wind Energy's Contribution to U.S. Electricity Supply," US Department of Energy, 2008.

³⁶ Secretary Steven Chu, "Testimony before the Senate Committee on Environment and Public Works on S. 1733, the Clean Energy Jobs and American Power Act," 27 October 2009.

Meanwhile, China is investing \$9 billion a month in clean energy and is expected to become the world's biggest market for wind and solar energy within 5 years.³⁷ While this is great for the environment – China currently gets 70 percent of its power from coal – the United States risks finding itself in the unfortunate position of trading our dependence on foreign oil with a new reliance on solar panels and renewable energy technology manufactured abroad. Already, China's commitment to the solar industry is spurring American technology companies to move their facilities across the Pacific. An Arizona company, First Solar, just signed a deal in September to build the world's largest solar farm, roughly the size of Manhattan and capable of powering 3 million homes, in China.³⁸ Also this year, U.S. Evergreen Solar Inc. moved its production facilities from Massachusetts to China, GE shuttered its solar production facility in Delaware, and BP's solar unit in Maryland ceased production of solar panels in favor of importing panels from China.³⁹

Devoting additional investment to renewable energy technologies such as solar and wind power would create jobs while simultaneously reducing our environmental impact and providing consumer savings.

We need to be creating clean energy jobs right now, not losing them. But, until we can generate more than 1 percent of electricity from solar energy, that will be difficult. A recent report by the Solar Energy Industry Foundation found that, if we can increase U.S. solar generation to 15 percent of electricity generation by 2020, we could create 880,000 economy-wide jobs.⁴⁰

If we are serious about investing in renewable energy and creating jobs we must also get serious about upgrading our electrical grid to maximize the efficiency of these new energy sources. In much of the country, the electrical grid still depends on the same technology deployed immediately after World War II. A report from the president's National Economic Council found that "power interruptions and outages cost American individuals and businesses at least \$80 billion each year."⁴¹

Upgrading the grid will enable utility companies to maintain a balance between supply and demand when integrating new energy sources such as wind and solar power. Both provide intermittent generation, meaning that more energy is produced on windy or sunny days than on calm or cloudy days. Smart Grid technology utilizes broadband networks to monitor consumer usage in real time and return unused energy to the grid, smoothing wide fluctuations in electricity demand. A recent survey of 15 dynamic electricity pricing experiments found that, when consumers had access to real time information such as smart thermostats at home, critical peak demand fell by 27% to 44%.⁴²

And deploying Smart Grid technology creates jobs. A report for the GridWise Alliance, an industry group, estimates up to 278,000 direct jobs could be created by deployment.

³⁷ Schmit, Julie. "China pushes solar, wind power development," *USA Today*, 18 November 2009.

³⁸ Ibid.

³⁹ Oster, Shai. "World's Top Polluter Emerges as Green Technology Leader," *Wall Street Journal*, 15 December 2009.

⁴⁰ Solar Energy Industries Association, <http://www.seia.org/cs/news_detail?pressrelease.id=672>

⁴¹ "A Strategy for American Innovation: Driving Towards Sustainable Growth and Quality Jobs," National Economic Council, Office of Science and Technology Policy, September 2009.

⁴² "Network Developments in Support of Innovation and User Needs," OECD, 9 December 2009.

POLICY RECOMMENDATIONS

Congress and the administration can help spur job creation and business investment in the economic sectors discussed above by targeting federal dollars into policies that leverage private resources. These include:

1. ENACT PRESIDENT OBAMA'S PROPOSED SMALL BUSINESS RELIEF PACKAGE

Congress should move quickly to enact President Obama's recently proposed \$33 billion Small Business Jobs and Wages Tax Credit. The credit will help small businesses hire the workers they would like to hire today, but until now have been unable to because of a lack of resources.

Under the proposal, employers would receive a tax credit of up to \$5,000 against their payroll taxes for every net new employee they hire in 2010. The credit would be administered off an employer's unemployment insurance wage base (equal to 72 percent of the unemployment insurance wage base increase, or a \$5,000 credit for each additional worker who earns at least \$7,000).

To ensure that small businesses receive the bulk of the incentive to hire, the maximum credit will be limited to \$500,000 per business. And to ensure that employers do not game the system, businesses that reduce employment or payrolls in 2010 would be ineligible for both the \$5,000 credit and the wage bonus.

Congress should also enact the president's proposal to transfer \$30 billion from the Troubled Asset Relief Program (TARP) to a new Small Business Lending Fund. We need to get credit back into the hands of small businesses and the best way to do that is to extend credit to the institutions that directly finance small businesses. Small and mid-size community banks, or those with assets under \$10 billion, are responsible for over 50 percent of small business lending.⁴³ The new Small Business Lending Fund would target these banks directly.

It would also be established to be separate and independent from TARP. Since TARP restrictions would not apply, banks could freely participate in this new program. And to insure effectiveness, the banks will actually be able to benefit more from the program the more small business loans they make. For all increases in small business lending over their 2009 baseline, participating banks lower the dividend rate they pay to the Treasury on that capital investment.

And because banks leverage capital when they increase lending, the initial \$30 billion invested in the new fund could be leveraged several times to create loans far greater than the original amount. This much-needed liquidity would go a long way towards helping small businesses finance the levels of investment the economy needs to create jobs again.

2. SIMPLIFY THE R&D TAX CREDIT, AND MAKE IT PERMANENT

When filing their taxes, companies engaged in research and development are currently required to choose between one of two possible credits:

- The federal "Research and Experimentation" (R&E) tax credit was first introduced in 1981 as a temporary tax break and has subsequently been extended thirteen times. The R&E

⁴³ "President Obama Outlines New Small Business Lending Fund," White House Press Release, 2 February 2010.

credit applies to 20 percent of qualified research expenditures (QREs) performed in the United States above a base amount. The formula for determining the base amount requires firms to multiply the average R&D-to-sales ratio from 1984 to 1988 by the average gross receipts for the most recent four years. Firms established after 1988 are considered “start-ups,” and are therefore required to employ a modified formula.

- The Alternative Simplified Credit (ASC) was first introduced in 2006 in order to provide additional incentives for R&D investment to companies that derived little benefit from the R&E credit. Companies that claim the ASC do not have to measure their gross receipts against a set base period. Instead, the ASC applies to 14 percent of QREs performed in the United States, over 50 percent of the average QREs for the prior three years.

Because the credits are not permanent, they can, and have been allowed to, expire, leaving many businesses in the lurch and diminishing the incentive for businesses considering whether to invest new dollars in American researchers.

Given the success of the R&D tax credit in meeting its policy objectives, we should make it permanent, allowing small businesses to budget for long-term innovative projects, including hiring salaried workers, without the risk of funding coming up short because the credit expires.

While the system is complex – its various iterations have had the effect of applying different standards, and providing varying credits, to competing companies – most experts agree that the credit has, on the whole, been successful. Studies on the R&E credit have revealed that (1) nearly 80 percent of the credit is, as a rule, applied to domestic salaries in the United States; and (2) the credit benefits small businesses as well as large corporations.⁴⁴ In 2005, 29 percent of firms claiming the credit had assets of less than \$1 million.⁴⁵

Given the success of the credit in meeting its policy objectives, we should make it permanent, allowing small businesses to budget for long-term innovative projects, including hiring salaried workers, without the risk of funding coming up short because the credit expires. But beyond making it permanent, we should level the playing field, requiring all firms to calculate their benefit using the same simple formula, the ASC.

If we want to spur U.S. investment in R&D and give more firms an incentive to perform their R&D here rather than in countries with more generous credits abroad, we should also increase the realized value of the credit to firms. According to a study by Ernst & Young, “the average company that claims the U.S. R&D credit only realizes a credit rate of 6%.”⁴⁶

That is why we recommend that Congress pass, and the President sign, a reconciled version of the Baucus-Hatch and Meek-Brady bills awaiting consideration in the Senate and House, re-

⁴⁴ “Research and Development Tax Credit,” R&D Credit Coalition, July 2009.

⁴⁵ “Supporting innovation and economic growth: The broad impact of the R&D credit in 2005,” Ernst & Young, April 2008.

⁴⁶ “International R&D Tax Incentives,” Ernst & Young, April 2008.

spectively. Their proposals would make permanent the ASC at 20 percent of 50 percent of QREs performed in the United States above the average QREs invested over the previous three years, while phasing out the regular credit after 2010. The Meek-Brady and Baucus-Hatch bills have the potential to increase the effective rate of the credit to 10 percent, which, if realized, could boost R&D spending, by our estimates, as much as \$20 billion.⁴⁷

3. ESTABLISH AN AMERICAN INVESTMENT BANK

The president's 2011 budget proposes a new \$4 billion dollar National Infrastructure Innovation & Finance Fund to focus on national and regional infrastructure investments. While this is significant and public investment in infrastructure is needed, the government does not have to shoulder the burden alone. According to McKinsey & Company, the world's 20 largest private infrastructure funds had nearly \$130 billion under management in 2008, with 77 percent of it raised in just two years.⁴⁸

This represents an enormous opportunity for funding our infrastructure needs. One way to seize that opportunity is to create an American version of the European Investment Bank (EIB), which has a half-century track record of success in financing productivity-enhancing projects.

The EIB was founded under the terms of the 1957 Treaty of Rome as the long-term lending institution of the European Union (EU). The EIB is owned by the member states of the EU, who make an initial contribution to the bank's capital-reserve fund according to their relative GDP. Otherwise, the bank is fully self-financing, borrowing on the financial markets to issue loans, and does not take any funds from the EU budget. The EIB operates autonomously, is a non-profit, and makes lending decisions based on the following charter criteria:

- Investments must help achieve EU objectives;
- These investments must be economically, financially, technically, and environmentally sound; and
- They should help attract other sources of funding (the EIB cannot lend more than 50 percent of the total cost of an individual project).

Because the EIB's shareholders are the EU member states, its debt carries the highest possible credit rating (AAA) on the money markets, allowing it to generate capital on very competitive terms. Borrowers range from small businesses to national governments. While repayment terms may vary, all loans must be paid back to the bank.

In 2007, the EIB raised €55 billion on the capital markets and made new loans totaling €47.8 billion⁴⁹ — 85 percent of which went toward further improvements to EU airports, highways, bridges, railroads, and other vital infrastructure. The remainder supported development projects around

⁴⁷ A recent Congressional Research Service (CRS) survey of the literature on price elasticity of the credit found a range from 0.2 to 2. Our estimates assume a dollar credit yields a dollar investment in R&D. In addition to being a simple calculation and the midpoint of the CRS research, we chose to rely on University of California, Berkeley professor Bronwyn Hall, an expert on the economics of innovation who has approximated elasticity to be about 1 in her research. See Hall, Bronwyn, "R&D Tax Policy During the Eighties: Success or Failure?," NBER Working Paper No. 4240.

⁴⁸ Spellman, James. "Building on Strong Foundations," *Financial Times*, 13 March 2008.

⁴⁹ European Investment Bank, Annual Report 2007, Volume II Financial Report.

the globe.

The Obama administration and Congress should establish an American Investment Bank (AIB), following the model of the EIB. The AIB could be staked with an initial capital-reserve fund from the federal government and one-time membership fees from the states. The AIB could then raise funds for infrastructure loans by issuing debt instruments backed by the government's credit rating. The skyrocketing growth in private investment funds shows that there is a large — and still untapped — market for infrastructure-backed assets. This market is a ready source of funds for public-private partnership in infrastructure investment.

The AIB, like the EIB, should have a charter that sets out clear investment goals. These should include the following:

- Projects should be evaluated based on sound economic criteria and their environmental impact;
- Such projects should promote community economic development and broad-based economic opportunity; and
- They should promote the maintenance and public safety of existing critical infrastructure.

An American Investment Bank would be able to raise funds for infrastructure development, promote public-private partnerships, and allocate funds efficiently without being subject to some of the pitfalls of annual budgeting. In addition, offering infrastructure-backed bonds is a great way to encourage ordinary Americans to participate while raising funds without raising taxes.

CONCLUSION

President Obama is right to make jobs the nation's most urgent economic priority. The private sector will always be the engine of economic and job growth, but a smart strategy on jobs, small business, and innovation is essential to a robust and lasting recovery. Timely and targeted measures to help small business and long-term efforts to promote investment in research and development, innovation, and infrastructure are the key to the robust economic and job growth on which America's future depends.

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