

Is the President Right When He Says the United States Needs 10,000 Engineers A Year? Why Not Let the Market Decide?

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Is The President Right When He Says The United States Needs 10,000 Engineers A Year? Why Not Let The Market Decide?

By Leonard Lynn & Hal Salzman
Leonard.Lynn@case.edu
HSalzman@rutgers.edu

President Obama and his high-tech CEO jobs advisory board say an answer to U.S. unemployment and other economic woes is to graduate an additional 10,000 engineers a year. Engineers are said to drive innovation and create jobs. More engineers mean more technology and more jobs. Training more engineers, they suggest, would also address fears of foreign competition, fueled by claims that China and India are graduating several times more engineers each year than the United States. Recently, CBS News reported claims by the president of Dow Chemical that the scarcity of qualified U.S. engineers had caused his company to open R&D labs in Brazil, China, India and Eastern Europe instead of the United States.

Today's calls to increase the engineering workforce echo those in the 1950s when Sputnik raised doubts about U.S. technological preeminence. The calls were renewed with the rise of the Japanese economic juggernaut in the 1970s and 1980s. American national well-being supposedly depended on the country's matching the output of engineers in those countries. And yet, a quarter century after Sputnik, while the Soviet Union continued to graduate several times as many engineers annually as the U.S., it continued its military and economic decline. And Japan's engineering graduation rate was still double that of the U.S. in the late 1980s as Japan began its descent into lost decades of economic growth and international influence.

The United States faces important challenges to its domestic economy and its global competitiveness, but the underlying problem is not a shortage of new engineering graduates. To be sure, engineers do develop new technologies that

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create jobs. But engineers can only make these contributions if there is demand for their services. Simply producing more engineers won't create technology and jobs any more than producing more cars for which there is no market helps car companies.

In recent years, around one-third of U.S. engineering graduates have not found engineering jobs. Last year, only about 60 percent of graduating engineers found jobs in engineering. So, where would an additional 10,000 engineers a year find jobs?

Does some market failure require interventions to increase the number of engineering graduates? A "natural experiment" provides some insight into this question. The market for petroleum engineers experienced little growth for about a quarter century until a few years ago when retirements and increased exploration caused a sharp demand for petroleum engineers. Entry-level salaries shot up for new graduates. The result? The number of graduates nearly tripled. The market worked fine to stimulate the supply of engineers. Based on this and other analyses we've done, it seems clear that if we don't have enough engineers to support U.S. economic growth and technological strength, the problem is more our ability to use engineers than our ability to train them.

Nor is the "threat" from China and India all that it's cracked up to be. Developing countries like India and China need huge numbers of engineers to help build roads and bridges and to run routine operations in plants. Compared to the 608 miles of new interstate highway built in the United States over the past decade, China has added over 30,000 miles. Similarly, building construction is booming in China to house rapid urbanization and the expansion of manufacturing capacity. Further, studies indicate as few as 10 percent of engineers in India and China have the skills a multinational firm needs, compared to 80 percent in the United States. Nor are many engineers in China, India or the U.S. actually developing new technology. Our data suggests that only around one in 20 are involved in the creation of new technology.

So, why are U.S. firms offshoring their R&D? If it really is because of shortages of U.S., engineers why are American engineering graduates having trouble finding jobs?

In our interviews with engineering managers at U.S. multinationals, we were told that they were offshoring engineering for the same reasons they were offshoring other activities -- to have a strong presence in markets that are growing far faster than those in the United States and to take advantage of lower offshore wages.

If the United States does need to have more engineers creating new technologies and jobs, why doesn't the current economy demand more engineers? If the U.S. government intervenes to dramatically increase the number of engineers graduating each year, fewer will find engineering jobs. Those who do will get lower salaries. The U.S. technology system will be damaged in the long run as future cohorts are discouraged from pursuing an engineering education.

-- Leonard Lynn is Professor Emeritus of Management Policy at Case

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Western University. Hal Salzman is Professor of Public Policy at the E.J. Bloustein School of Planning and Public Policy and the J.J. Heldrich Center for Workforce Development at Rutgers University. For the past several years, the two have been conducting research on the training of engineers, the globalization of engineering and how these relate to international competitiveness. Their studies have been funded by NSF, NBER, the Sloan Foundation and others. A full paper on the issue is located at <http://policy.rutgers.edu/faculty/salzman/EngineeringDemandSkills-SalzmanLynn2010APPAM-vx.pdf>.

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