

Economics Program Working Paper Series

“The Case for Businesses to Invest in Post-Secondary Credentials”

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A background paper for:

“Framing the Business Case: What Will Compel U.S. Business to Support Efforts to Increase the Numbers of Post-Secondary Credentials Among Low-Wage 16 to 26 Year Olds?”

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About the Report: The Conference Board took up the charge to identify what will compel *U.S. businesses* to become involved in efforts to increase the number of low-income 16-26 year olds with post-secondary credentials (focusing on the sub-baccalaureate credentials). This was a multi-step process, of which this white paper is one output. The process began by identifying arguments that should be compelling to business leaders, as distinct from social, individual, or political actors. CEOs and other business leaders were then interviewed to “test” these arguments, and further to discover whether there were arguments or other factors which might compel a business leader to become involved. As the interviews progressed, and it was discovered which arguments resonated with business leaders and which arguments did not, both the interviews and the white paper were modified. These discoveries included four common arguments focused on the benefits to companies, and a refocusing away from “low-income” to “low-skilled.” This white paper contains what we believe is the best available, rigorously tested, empirical evidence supporting the four arguments that most resonated with the business leaders we interviewed. In effect, many arguments about social good or poverty reduction fell outside the scope of this framework.

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The Case for Businesses to Invest in Post-Secondary Credentials

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Abstract:

This paper outlines the changes in the demographics and business environment in the U.S. that are increasing the demand for more skilled, higher educated workers. The literature around the returns to education is then reviewed, looking specifically for evidence of returns to businesses from investing in sub-baccalaureate post-secondary credentials. Four benefits to businesses from investing are explored: (1) increased labor productivity, (2) improved selection and retention, (3) expanding markets, and (4) improved communities. For each of the four arguments, there is substantial evidence that increasing educational attainment or training produces positive outcomes. However, much of the evidence pertains to baccalaureate degrees relative to high school diplomas; there is scant evidence focusing specifically on sub-baccalaureate post-secondary credentials.

¹ I would like to thank Anthony Carnevale, Janet Hao, Kathy Hughes, Parminder Jassal, Jane Polin, Jeff Strohl, Ken Troske, and Michelle Van Noy for their helpful comments on an earlier draft. Opinions expressed in this draft are my own and are not necessarily endorsed by The Conference Board. All remaining errors are my own.

Many of the factors commonly associated with growth, both in economies and in companies, have at their core a knowledge component. Increasing labor productivity means getting more output per unit of labor input, and this is often achieved through technological advances. Technology is “the embodiment of knowledge in the machines, modes, and methods of production.”² Each new wave of technology adds a layer of information and knowledge that must be mastered before the next advances can take place. And as the pace of technological innovation has increased, so too have the demands for a skilled, “knowledge” workforce.

The indirect role of an educated workforce is to fuel innovation and the diffusion of new technologies so that businesses can realize the benefits sooner. “Furthermore, highly educated labor is the primary input into research and development (R&D), and some estimates suggest that the intensity of R&D has been a significant (and possibly the largest measurable) contributor to growth in U.S. labor productivity over the past fifty years.”³ As the U.S. transitions to a knowledge-based economy, workers with non-routine analytic and interactive skills are becoming increasingly valuable. These mid-level skills exist in a wide array of industries, from manufacturing to health care to transportation.

Part I of this report documents the U.S. demographic and economic changes that are driving an increasing demand for workers with some post-secondary credential at a time when growth in that segment of the labor force is stagnating. Growth in the percentage of new workforce entrants with a college degree is stagnating, the large baby boomer generation is nearing retirement, and many of the jobs that will replace them could require greater levels of education than possessed by the exiting boomers. Already there is substantial demand for workers with some kind of post-secondary credential, as employers are looking for workers with more complex skill sets.

Part II outlines the existing evidence to support four main arguments for businesses to invest in post-secondary credentialing. Through interviews with CEOs and other business leaders from 33 companies during the summer of 2009, a team of researchers at The Conference Board found four claims to be the most common justifications for companies to become involved in post-secondary credentialing:

1. increased labor productivity,
2. improved availability, selection, and retention of new hires,

² Richard W. Judy, “Workforce Planning in the Knowledge-Based Economy,” prepared for the 7th Annual Conference of the Emirates Center for Strategic Studies and Research, February 11, 2002, <http://tiny.cc/N9CCm>

³ J. Bradford DeLong, Claudia Goldin, and Lawrence F. Katz, “Sustaining U.S. Economic Growth,” in H. Aaron, et al., eds., *Agenda for the Nation* (Washington, D.C.: The Brookings Institution) 2003.

3. creation of new and expansion of existing markets, and
4. fostering of better communities.

Interviewees revealed one or more of these four statements are either driving their current activities, or could persuade them to become involved. The existing empirical evidence provides support for each of these arguments, although the level of detail and strength of research would benefit from further advances. In particular, the business returns to investing in sub-baccalaureate credentials are understudied, and in some cases nonexistent.

A perfect storm of changing demographics, immigration patterns, education, and public policies has produced an emerging need for business leaders to invest in the education of low skilled youth, not only because it is good for society, but because it will become increasingly vital to the long-term success of their companies. Can businesses be persuaded to invest in post-secondary credentials for tomorrow's workforce? The changing business environment suggests they may have no choice. Fortunately, existing research also suggests that many firms may find spending on post-secondary credentials for both their existing and future workers to be a financially sound business investment.

I. A Changing Business Environment Raises the Demand for Technically Skilled Workers: Supporting the business case for investing in low-skill youth

Growth in skilled labor slowing

In the U.S. in particular, much of the economic growth over the past century has been built on the educational upgrading from one generation to the next.⁴ Throughout the 20th century, the entering cohort of workers has been more educated than the retiring cohort of workers. As a result, the United States has benefited from a systematic replacement of older, less educated workers with younger, more educated workers. The rate of increase in educational attainment, however, has slowed in the last 30 years. From the late 1950s through the mid 1970s, the percentage of people ages 25-29 that had completed high school increased from about 60 percent in 1957 to 85 percent in 1976. However, since the mid 1970s the percentage of people ages 25-29 that had completed high school remained relatively constant, fluctuating between 85 percent and 88 percent.

<See Chart 1: Percent of U.S. residents age 25-29 who completed high school or 4-year college>

Similarly, 4-year college completion rates for people ages 25-29 increased from the late 1950s through the mid-1970s, from about 10 percent in 1957 to about 24 percent in 1977. Again, though, educational attainment stagnated from the mid-1970s through the mid-1990s, with 4-year college completion rates for people aged 25-29 around 22-24 percent. In contrast to the high school completion rates, there was a second period of increasing 4-year college completion rates for 25-29-year-olds beginning in the mid-1990s with completion rates increasing from 24 percent to 29 percent by 2000.

Despite some delays to retirement due to the 2008 stock market decline, the pending exit of baby boomers from the labor market will leave many companies searching for replacement talent. Not only will employers need to find new bodies to replace many of the departing ones, but due to technological advances these new bodies must contain a level of skills that in many cases exceed the skills being lost.

Business, then, can no longer rely on the U.S. educational system to deliver a skilled workforce. Too many individuals fail to obtain any post-secondary credential, leaving businesses to match an under-skilled labor pool to an increasingly skilled work environment. Students who perceive a relationship between school and the labor market are more likely to remain in school and complete a degree.

⁴ Claudia Goldin and Lawrence F. Katz, *The Race Between Education and Technology* (Cambridge, MA: Harvard University Press) 2008.

Businesses that work to strengthen this relationship and make it transparent to current and future students will benefit from both greater knowledge about their potential workforce and a generally higher skilled labor pool from which to draw.

Demand for skilled labor is high

The rising demand for workers with more cognitive skills has coincided with a rise in the “computerization” of the workplace, as several studies find the utilization of high-skill workers “positively correlated with capital intensity and the implementation of new technologies both across industries and across plants within industries.”⁵ The growth of computer use across industries has a strong positive effect on employment of more educated workers, and there is a positive relationship between the growth in computer usage and skill upgrading within industries.⁶

<See Chart 2: Task input of jobs in the U.S. workforce>

Since 1960 there has been a shift in the jobs people are working away from routine and manual tasks, and towards abstract (cognitive analytic and interactive) tasks. This shift in the overall make-up of U.S. jobs has occurred primarily within industries, and is concentrated where computer technologies have been most rapidly adopted.⁷ The result is that employers are looking for workers with a set of more complex skills for both traditional occupations and new ones.

This “hollowing out” of the skill distribution does not eliminate middle skill jobs. Middle skill jobs are qualified as Job Zone 3 using the O*NET Job Zones classification: “Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate’s degree.”⁸ These jobs appear in large abundance in The Conference Board Help-Wanted OnLine Data Series.⁹ Job Zone 4, which primarily requires a bachelor’s degree, is the next most common group of occupations advertised

⁵ David H. Autor, Lawrence F. Katz, and Alan B. Krueger, “Computing Inequality: Have Computers Changed the Labor Market?” *The Quarterly Journal of Economics* 113, no. 4, (1998), citing Bartel and Lichtenberg (1987), Doms, Dunne, and Troske (1997), and Levy and Murnane (1996).

⁶ Autor, Katz, and Krueger, “Computing Inequality.”

⁷ David H. Autor, Frank Levy, and Richard J. Murnane, “The Skill Content of Recent Technological Change: An Empirical Exploration,” *The Quarterly Journal of Economics* 118, no. 4 (2003), pages 1279-1333.

⁸ O*NET Online Help, Job Zones, accessed May 18, 2009: <http://tiny.cc/YqQdl>

⁹ The Conference Board Help-Wanted OnLine Data Series provides a look at the volume and types of jobs being advertised by employers on web-based job boards. Each job posting is assigned an SOC occupation code by Wanted Analytics, which was used to match the job ads to the O*NET Job Zones. There are five O*NET Job Zones, which are clusters of occupations based on “how most people get into the work, how much overall experience people need to do the work, how much education people need to do the work, and how much on-the-job training people need to do the work” (see Appendix 1 for more details).

online, followed by Job Zone 2, which requires a high school diploma and usually some post-secondary education.

*<See Chart 3: Online job ads, by O*NET job zones>*

Not only has Job Zone 3 consistently had the most online job postings of any job zone, but it has maintained its share of the total number of online ads over the last three years. More than one-third of the online job postings each quarter have been for occupations that fall in Job Zone 3. The predominance of Job Zone 3 occupations relative to other zones on a national level holds for most states as well. In April 2009, Job Zone 3 had the most online job postings in every state except Virginia, Maryland, New Jersey, and Massachusetts, where Job Zone 4 was the dominant occupation group. The four states with the greatest concentration of online ads in Job Zone 3 are Alaska, New Mexico, Wyoming, and Nevada. In Nevada, more than 40 percent of the April online job ads were for occupations in Job Zone 3.

<See Chart 4: Percentage of available online ads in job zone 3>

The shifts in skills required for work do not portend the disappearance of “middle skilled” jobs. While the percentage increases in the number of jobs are larger for high and low skill, the total raw numbers are quite substantial for middle skill, and still larger than low skill. Also, labor supply growth slowdowns are likely to be most severe in middle skill jobs, because:

- high and middle skill jobs show the sharpest decline in new entrants;
- immigration fills high and low skill jobs, but not middle skill jobs; and
- retirement is likely to be postponed by high skill boomers but not middle skill boomers.¹⁰

New workforce entrants already failing to meet employers’ needs

A high demand for skilled workers is not indicative of an emerging problem as long as there are a sufficient number of skilled workers to meet that demand. However, employers are already lamenting the general skill levels of their incoming workforce; with U.S. demographics shifting towards groups of traditionally lower educational attainment, the challenges are increasing.

Surveys undertaken by The Conference Board and partners capture employers’ dissatisfaction with recent workforce entrants. Their spring 2006 survey found that “over 40 percent of employer respondents rate

¹⁰ Harry J. Holzer and Robert I. Lerman, “America’s Forgotten Middle-Skill Jobs: Education and Training Requirements in the Next Decade and Beyond,” The Workforce Alliance: Washington D.C., November 2007.

the *Overall Preparation* of high school graduates for the entry-level jobs they fill as ‘deficient,’ whereas only 11% of respondents said their two-year college or technical school graduates were ‘deficient.’”¹¹ Moreover, when survey respondents were asked which skills they expected to increase in importance over the next five years, they identified skills that at least 20% of respondents rate both high school graduates and two-year college or technical school graduates currently rate as “deficient.” A subsequent spring 2008 survey found almost half of the respondents report providing workforce training programs to address remedial deficiencies.¹²

In addition to employers’ unrest about the current workforce, future workforce entrants in the U.S. could be increasingly less educated. Slowly but steadily the U.S. workforce is becoming more racially and ethnically diverse. Current projections are for the U.S. workforce to become more than 50% non-white by 2050, as growth in the labor force will disproportionately come from Hispanics and blacks.¹³ This is an important development, because educational attainment for these two groups is below today’s workforce average.¹⁴

Immigration will not fill the gaps

Turning to foreign workers is no cure-all either, with 12 percent of the population foreign born (more than 37 million residents), 6.6 million visas issued in 2008, and the focus of U.S. immigration policies skewed toward families instead of work.^{15,16}

“Immigration as a labor market strategy has advantages; it can infuse a supply of labor where there are shortages thus keeping businesses competitive. But it risks... delaying alternatives to address those shortages.... A ready-supply of immigrants may lead employers to put off the adoption of new technology or... business strategies.”¹⁷

¹¹ Jill Casner-Lotto and Linda Barrington, *Are They Really Ready to Work? Employers’ Perspectives on the Basic Knowledge and Applied Skills of New Entrants to the 21st Century U.S. Workforce*, The Conference Board, Corporate Voices for Working Families, the Partnership for 21st Century Skills, and the Society for Human Resource Management, 2006.

¹² Jill Casner-Lotto, Elyse Rosenbaum, and Mary Wright. *The Ill-Prepared U.S. Workforce: Exploring the Challenges of Employer-Provided Workforce Readiness Training*. The Conference Board, Corporate Voices for Working Families, American Society for Training and Development, and the Society for Human Resource Management, 2009.

¹³ U.S. Bureau of Labor Statistics, Labor Force (Demographic) Data, Long-term projections to 2050, <http://www.bls.gov/emp/emplab1.htm>.

¹⁴ Richard B. Freeman, “Is a Great Labor Shortage Coming? Replacement Demand in the Global Economy,” in Harry J. Holzer and Demetra Smith Nightegale, eds. *Reshaping the American Workforce in a Changing Economy*, Washington: D.C.: The Urban Institute Press, 2007.

¹⁵ U.S. Census Bureau, *American Community Survey*, Selected Population Profile in the United States: Foreign Born, 2005-2007 American Community Survey 3-Year Estimates, <http://tiny.cc/N4yau>

¹⁶ U.S. Department of State, *Report of the Visa Office 2008*, Table 1, <http://tiny.cc/cG7hl>

¹⁷ B. Lindsay Lowell and Susan Martin, *Research on Migration and Development*, Department of Economic and Social Affairs, Fourth Coordination Meeting on International Migration (New York: United Nations Secretariat), 2005.

With radical changes to U.S. immigration policies unlikely, increasing immigration rates will only serve to heighten the potential shortage of middle-skill workers. Recent immigrants have been predominantly very high educated or very low educated, with the bulk of new entrants possessing less than a high school diploma.

“The (global) mobility of the highly skilled has been growing rapidly in volume and complexity. The 1990s saw a surge in the number of highly skilled migrants entering the United States, Canada, Australia, and Western Europe. At the same time as more skilled migrants settle permanently in the countries, another stream increasingly circulates between countries. The occupational composition of both streams has broadened over time. These trends are related to the nature of modern economies and their appetite for knowledge workers; the impacts of an aging population and the demands of the healthcare and caring sectors; the process of globalization; and competitive immigration policies.”¹⁸

The number of immigrants in the U.S. labor force is as high as it’s been in more than 100 years (14.7 percent of the labor force in 2005), and projections of the future labor force suggests that one-third of the workers in 2030 could be immigrants.¹⁹ New flows of immigrants are rather dichotic; over the last 30 years the proportion of immigrants that held a college degree was higher than the proportion of natives, yet the proportion of immigrants with less than a high school degree was also higher than the proportion of natives. Over the next thirty years, immigrants are expected to grow from 10 to 15 percent of the labor force with less than a high school degree.²⁰ With the United States facing an aging population, immigration may appear as an attractive solution to a potential labor market shortage. However, at their current size and immigration rates it would take an increase in the number of new immigrants annually over a long period of time to have any substantial impacts on the demographic structure of a U.S. population exceeding 300 million.

These developments have put U.S. businesses in a precarious situation. The increasing demand for more skilled workers is challenged by the slowdown in the rate at which older, less educated workers are replaced by higher educated new entrants. For many companies this is a local problem, which in some places amplifies the national trends.

¹⁸ Lowell and Martin, *Research on Migration and Development*.

¹⁹ B. Lindsay Lowell, Julia Gelatt and Jeanne Batalova, “Immigrants and Labor Force Trends: The Future, Past, and Present,” *Report to the Independent Task Force on Immigration and America’s Future*, Insight no. 17 (Washington, DC: Migration Policy Institute) 2006.

²⁰ Lowell, Gelatt and Batalova, “Immigrants and Labor Force Trends.”

Homegrown talent matters

A firm's dependence on local talent depends on two main factors:

- 1 the firm's willingness to relocate, and
- 2 workers' willingness to relocate.

Firms less likely to relocate that seek employees from a pool of workers less likely to relocate must rely on their local talent pools.

Despite well-publicized stories of plant relocations, firms are generally immobile.

"Many, probably most, small and medium-sized companies are located where their founders lived when they started the company. The same is true for the headquarters of many large companies. Eli Lilly's head offices are still in Indianapolis where chemist Eli Lilly started the company. Gottlieb Daimler founded Daimler-Motoren-Gesellschaft in Stuttgart; Daimler-Benz is still there. Soichiro Honda started in Hamamatsu, Japan; Hondas are still made there. Unilever's origins lay in London and Rotterdam; its 73 factories are now scattered but its bifurcated head offices remain in the two cities of its birth.

Many companies grow by acquisition. When they do, they frequently end up with parts of their businesses located where the acquired companies were previously located. When Sun Microsystems bought Star Division Corporation, it ended up with a business in Hamburg, Germany."²¹

Likewise, in the United States people are less mobile than we often like to believe. While migration rates rose from 1900 to 1970, they have since leveled off.²² The Census Bureau reports that the national mover rate hit an all-time low in 2008, at just 11.8 percent of U.S. residents.²³ Likewise, interstate mobility increases with educational attainment—those with a four-year college degree or more are almost twice as likely to move across state lines as those with a high school diploma or less.²⁴

<See Chart 5: *Percentage of Persons Age 25+ who Move in a Given Year, by Education Level*>

²¹ Richard W. Judy, "How multinationals choose where to do business and how much people factors figure," *Worldlink* 12, no. 3 (2002) p. 4-6.

²² Joshua L. Rosenbloom and William A. Sundstrom, "The Decline and Rise of Interstate Migration in the United States: Evidence from the IPUMS, 1850-1990," *National Bureau of Economic Research*, Working Paper 9857, July 2003.

²³ U.S. Census Bureau, "Residential Mover Rate in U.S. Is Lowest since Census Bureau Began Tracking in 1948," *Press release*, April 22, 2009, <http://tiny.cc/lclKh>. This data underpins many of the recent news articles about the decline in mobility within the United States and the potential impact of the recession. See, for example, Joel Kotkin, "There's No Place Like Home," *Newsweek*, October 19, 2009.

²⁴ Author's tabulations from Table 1, "Geographical Mobility: 2007-2008 Detailed Tables," U.S. Census Bureau, <http://tiny.cc/RTtLp>.

Low mobility in a given year can mask the mobility of people over their lifetime: if each person in a population moved only once, and five percent of the population moved each year, each individual in the population will have moved once within 20 years. To tackle this problem, new research uses the Panel Study of Income Dynamics to look at the percentages of people who reside in the same state as when they were 14 years old, finding that the probability of living in the same state, or in the same metropolitan area, that you lived in at age 14 declines with age.²⁵

Education and race are shown to be the most dominant predictors of propensity to stay; low-income status has little influence in mobility once education and race are accounted for. Higher education, in particular (four-year) college degree versus non-college, is associated with a lower probability of staying in the same metropolitan area. High school graduates are estimated to have an 80% probability of living at age 30 in the same metropolitan area as when they were 14; this probability falls to 71% for those with post-secondary sub-baccalaureate credentials, and to 53% for those with a 4-year degree.²⁶

U.S. businesses are facing significant challenges meeting their labor needs

Business, then, is going to be increasingly pressured to solve this problem itself. Through increased investment in educational opportunities for the less skilled (both existing and potential) employees, companies can meet their own needs. Further, business will benefit from this investment in a variety of ways, including increased labor productivity, more efficient recruitment and retention, expanding their market presence, and improving the communities they operate in.

²⁵ Timothy J. Bartik, "What Proportion of Children Stay in the Same Location as Adults, and How Does This Vary Across Location and Groups?" *Upjohn Institute*, Staff Working Paper No. 09-145, February 2009.

²⁶ See figure 13 in Bartik, "What Proportion of Children Stay in the Same Location as Adults, and How Does This Vary Across Location and Groups?"

II. Four Strong Economic and Societal Reasons for Business to Invest in Post-Secondary Credentials

For companies to continue to grow, and to continue to make better products delivered in less time at a lower price, a continually more skilled workforce is required. With U.S. demographics shifting towards groups of traditionally lower educational attainment, the challenges are increasing. The majority of individuals between the ages of 16-26 who do not attend four year colleges are skills deficient relative to their college-bound peers.²⁷ Businesses can benefit from increasing the number of individuals with a post-secondary credential in the following four ways.

1. Investing in post-secondary credentials increases productivity

There exists a dynamic between skill acquisition and ability—more able people acquire more skills, and the more skills a person acquires the more able they become—that both amplifies the returns to training and complicates the efforts to obtain precise estimates of the returns to training.²⁸ As Jacob Mincer observed almost 50 years ago, “formal school instruction is neither an exclusive nor a sufficient method of training the labor force.”²⁹ Training on the job adds specific skills the employer needs that are often difficult to find in the general labor market.

The vast majority of the early research attempting to estimate the value of firm-provided training focuses on the individual’s return—that is, the increased wage earned after training. In many cases, data availability was the primary factor in the researchers’ decisions to focus on trainee wages instead of firm productivity. As firm-level data became available, researchers began to fill this void and estimate both the private individual returns and the firm returns to training.

Second-generation studies of the returns to training, which we focus on here, have made an effort to correct estimates for problems stemming from the complementary dynamic of ability and training. Since more able individuals seek out training, it is not appropriate to simply compare their post-training earnings to the less-skilled worker who did not receive training without adjusting for the difference in

²⁷ James J. Heckman, “Policies to Foster Human Capital,” *Research in Economics* 54, no. 1(2000), 3-56. See also the Alliance for Excellent Education’s September 2007 Issue Brief, “High School Teaching for the Twenty-First Century: Preparing Students for College,” which notes that “a mere 34 percent [of high school students] graduate ready for college.”

²⁸ Heckman, “Policies to Foster Human Capital.”

²⁹ Jacob Mincer, “On-the-Job Training: Costs, Returns, and Some Implications,” *Journal of Political Economy* 70, no. S5 (1962), p. 50.

ability. Estimates of the wage premium from participating in on-the-job training have settled between five percent and 15 percent, with much of the variation due to the duration and intensity of the training.³⁰

If the returns to training are only captured by the individual, the firm would be wise to shift all of the costs of training onto the worker. However, the vast majority of studies addressing the firm's returns to training find significant returns captured by the firm, signaling that it can be advantageous for firms to incur some of the costs of training. If left up to the discretion of the employee, a sub-optimal level of training will be reached, as the individual does not internalize the firm benefits of training.

Two studies using surveys of U.S. employers from 1982 and 1992 estimate the productivity gains firms receive from providing training.³¹ These studies found that a 10 percent increase in training hours for new hires was associated with a two percent to three percent increase in labor productivity growth within the firm.³² In addition, they find a substantially smaller impact on wage growth (about 0.2 percent per 10 percent increase in training hours), suggesting that the firms in their sample were able to capture a substantial amount of the returns to training. Other studies that have looked at on-the-job or informal training have found similarly scaled labor productivity increases (less than five percent per 10 percent increase in training).³³

<See Chart 6: Productivity returns to training in U.S. firms>

Studies attempting to estimate the impacts of formal and off-the-job training programs find generally larger estimates for productivity gains captured by the firm. A 10 percent increase in off-the-job training time has been found to increase productivity by six percent to 12 percent, while a 10 percent increase in formal training time increases productivity by around 10 percent.^{34,35} While the above results were

³⁰ See, for example, Alan Barrett and Philip J. O'Connell, "Does Training Generally Work? The Returns to In-Company Training," *Industrial and Labor Relations Review* 54, no. 3 (2001) p. 647-662.

³¹ John M. Barron, Dan A. Black, and Mark A. Loewenstein, "Job Matching and On-the-Job Training," *Journal of Labor Economics* 7, no. 1 (1989) p. 1-19; John M. Barron, Mark C. Berger, and Dan A. Black, "Do Workers Pay for On-the-Job Training?" *Journal of Human Resources* 34, no. 2 (1999) p. 235-252.

³² Productivity measures in these studies are constructed from a manager's evaluation of the employee, based on a 0-100 scale, where 100 was the maximum productivity rating any employee could possibly obtain and zero meant no productivity.

³³ Lisa M. Lynch, "Private-Sector Training and the Earnings of Young Workers," *American Economic Review* 82, no. 1 (1992) p. 299-312; Ann P. Bartel, "Productivity Gains from the Implementation of Employee Training Programs," *Industrial Relations* 33, no. 4 (1994) p. 411-425; Sandra E. Black and Lisa M. Lynch, "Human-Capital Investments and Productivity," *American Economic Review* 86, no. 2 (1996) p. 263-267; Xiangmin Liu and Rosemary Batt, "The Economic Pay-Offs to Informal Training: Evidence from Routine Service Work," *Industrial and Labor Relations Review* 61, no. 1 (2007) p. 75-89.

³⁴ Lynch, "Private-Sector Training and the Earnings of Young Workers."

³⁵ Harry J. Holzer, Richard N. Block, Marcus Cheatham, and Jack H. Knott, "Are Training Subsidies for Firms Effective? The Michigan Experience," *Industrial and Labor Relations Review* 46, no. 4 (1993), p. 625-636.

restricted to data from U.S. employers and residents, studies using European data find similar results. Productivity increases were on average three percent, but as much as eight percent for each additional 10 percent of training time, while apprenticeships were demonstrated to increase productivity by six percent to 11 percent in a study of German firms.^{36,37}

<See Chart 7: Productivity returns to training in European firms>

Most of the studies reviewed using U.S. data to estimate the productivity returns to training lack sufficient data to construct a return on investment estimate. These studies also ignore any other benefits the firms receive from training, such as reduced turnover (which are discussed in the next section). As a result the preceding analysis does not necessarily demonstrate which method of training is best, or whether training is the most profitable use of the firm's resources.³⁸ These questions can only be addressed with adequate data on both the costs and benefits, and the cost data and complete measures of firm benefits are most often missing from these studies.

In an attempt to remedy this, Laurie Bassi and coauthors estimated the impact of training expenditures on stock prices for nearly 400 publicly traded U.S. firms.³⁹ They found that firm stock price increases about one basis point for each additional dollar of training expenditures per employee—a relationship that “is not sensitive to conditioning on industry or other firm characteristics.” Moreover, the authors proceed to demonstrate that a portfolio of firms investing “more than \$1,000 per worker on training in a given year” outperformed the S&P 500 index by 5.6 percentage points annually from 1997 to 2001—a period spanning both rapid expansion and economic contraction.⁴⁰

The evidence shows productivity gains from increased training. Those studies that look at both the wage returns and the productivity returns find that any gains accrued to the worker are dwarfed by the gains to

³⁶ Gerard Ballot, Fathi Fakhfakh and Erol Taymaz, “Who Benefits from Training and R&D, the Firm or the Workers?,” *British Journal of Industrial Relations* 44, no. 3 (2006) p. 473-495; Lorraine Dearden, Howard Reed, and John Van Reenen, “The Impact of Training on Productivity and Wages: Evidence from British Panel Data,” *Oxford Bulletin of Economics and Statistics* 68, no. 4 (2006) p. 397-421; Thomas Zwick, “The Impact of Training Intensity on Establishment Productivity,” *Industrial Relations* 45, no. 1 (2006) p. 26-46; Gabriella Conti, “Training, Productivity, and Wages in Italy,” *Labour Economics* 12, no. 4 (2005) p. 557-576; Barrett and O’Connell, “Does Training Generally Work?”

³⁷ Daron Acemoglu and Jorn-Steffen Pischke, “Why Do Firms Train? Theory and Evidence,” *The Quarterly Journal of Economics* 113, no. 1 (1998) p. 78-118.

³⁸ See, for example, the quote from Liu and Batt later in this section. In addition, these studies do not consider other benefits of training which may be of interest to the firm. These benefits are discussed in the next section.

³⁹ Laurie Bassi, Paul Harrison, Jens Ludwig, and Daniel McMurrer, “The Impact of U.S. Firms’ Investments in Human Capital on Stock Prices,” *McBassi & Company*, 2004, available at www.mcbassi.com

⁴⁰ See also Laurie Bassi and Daniel McMurrer, “How’s Your Return on People?” *Harvard Business Review* 82, no. 3 (2004) p. 18.

the firm. In studies using U.S. data, the percentage gains to the firm were an average of 7.3 times as large as the percentage gains to the worker. This large discrepancy suggests that if left to their own discretion, employees would severely under-invest in training, and firms would lose out on significant productivity gains.

A search for studies focused on training for new labor market entrants or recent graduates proved difficult. The vast majority of studies looking at the returns to training made no distinction between the ages of trainees. The studies more relevant to recent high school graduates are those that looked at apprenticeships in Germany and Ireland.⁴¹ Interestingly, these studies reported some of the largest productivity returns for the firms.

Like the returns to training, much of the literature estimating the returns to community college (CC) education focuses on the earnings premium. Summarizing much of the earlier research on community colleges, Thomas Kane and Cecilia Elena Rouse report that the average community college entrant who enrolls in CC but does not complete a degree earns nine to 13 percent more than the average high school graduate with similar grades, test scores, etc.; each year of community college is associated with a five to eight percent increase in annual earnings (which is equivalent to the returns to a year's worth of credits at a four-year college) while completing an associate's degree is associated with a 15-27 percent increase in annual earnings.⁴²

The general findings by Kane and Rouse are consistent with more recent studies, which have explored more of the variations within the returns to schooling choices at the post-secondary sub-baccalaureate level.⁴³ Returns are consistently higher for women than men, and this advantage has been attributed to the different areas of study women choose—much of the estimates vary by types of courses taken. Returns tend to be higher for technical and health care related disciplines—e.g., computer network analysis, registered nursing, and accounting technology.⁴⁴

⁴¹ Acemoglu and Pischke, "Why Do Firms Train?"; Barrett and O'Connell, "Does Training Generally Work?"

⁴² Thomas J. Kane and Cecilia Elena Rouse, "The Community College: Educating Students at the Margin Between College and Work," *The Journal of Economic Perspectives* 13, no. 1 (1999), p. 63-84.

⁴³ Glenn Blomquist, Paul A. Coomes, Christopher Jespen, Brandon Koford, Barry Kornstein, and Kenneth R. Troske, *The Individual, Regional, and State Economic Impacts of Kentucky Community and Technical Colleges*, KCTCS Report, October 2007; Dave E. Marcotte, "The Earnings Effect of Education at Community Colleges," University of Maryland Baltimore County and Institute for the Study of Labor (IZA), September 2006, available at: <http://ssrn.com/abstract=937364>; Thomas J. Kane and Cecilia Elena Rouse, "Labor Market Returns to Two- and Four-Year Colleges," *The American Economic Review* 85, no. 3 (1995), p. 600-614.

⁴⁴ Louis Jacobson, Robert LaLonde, and Daniel G. Sullivan, "Estimating the Returns to Community College Schooling for Displaced Workers," *Journal of Econometrics* 125, no. 1-2 (2005) p. 271-304; *Washington State Board for Community & Technical Colleges*, "Investment, Innovation, and Impact," January 2009.

Returns also vary by the type of program—associate’s degrees have greater returns than diplomas, which have greater returns than certificates.⁴⁵ Long-run returns also vary by type of program, with associate’s degrees demonstrating the most persistent returns over time, while returns to certificates are greatest in the short run and may even disappear in the long run. Additionally, recent studies have shown a significant value placed on the receipt of a “credential.” That is, if two similar individuals who obtain the same amount of post-secondary education (in the same classes), the one holding a credential signifying the completion of some designated set of coursework is valued significantly more by employers.⁴⁶

If the literature on training is any indication (where labor productivity increases were approximately 10 times larger than wage increases to the worker), firms should expect substantially greater returns relative to the earnings premium received by the worker. We know that generally firms find more educated workers to be more productive.⁴⁷ Yet the empirical research on the returns to community and technical college education have focused on the wage returns to the individual with little mention of the returns to the firm, except to assume that if the worker is earning a higher wage the firm must find him/her more productive. Indeed, this characterization also applies to bachelor’s degrees as well—there is little empirical research on the direct productivity returns to the firm from a worker obtaining a bachelor’s degree.

A few studies have noted the general benefits to firms hiring more educated workers.⁴⁸ Others have noted the macroeconomic returns from a more educated workforce.⁴⁹ However, we are not aware of any studies making specific reference to those educated between high school and four-year college degrees. This is a significant gap in the existing literature that needs to be filled in order to provide a more thorough business case for investing in credentialing through community and technical colleges.

⁴⁵ Christopher Jespen, Kenneth R. Troske, and Paul Coomes, “The Labor Market Returns for Community College Degrees, Diplomas, and Certificates,” mimeo, University of Kentucky, April 2008; Duane E. Leigh and Andrew M. Gill, “Labor Market Returns to Community Colleges: Evidence for Returning Adults,” *Journal of Human Resources* 32(2), Spring 2007.

⁴⁶ W. Norton Grubb, “The Returns to Education in the Sub-Baccalaureate Labor Market,” *Economics of Education Review* 16(3), 1997; David A. Jaeger and Marianne E. Page, “Degrees Matter: New Evidence on Sheepskin Effects in the Returns to Education,” *The Review of Economics and Statistics* 78(4), November 1996.

⁴⁷ Thomas W. H. Ng and Daniel C. Feldman, “How Broadly Does Education Contribute to Job Performance?” *Personnel Psychology*, 62, 2009; Judith K. Hellerstein, David Neumark, and Kenneth R. Troske, “Wages, Productivity, and Worker Characteristics: Evidence from Plant-Level Production Functions and Wage Equations,” *Journal of Labor Economics*, July 1999; John Pencavel, “Higher Education, Productivity, and Earnings: A Review,” *Journal of Economic Education*, Fall 1991.

⁴⁸ See, for example, Frank L. Schmidt and John E. Hunter, “The Validity and Utility of Selection Methods in Personnel Psychology: Practical and theoretical Implications of 85 Years of Research Findings,” *Psychological Bulletin*, 124(2), 1998.

⁴⁹ See, for example, Eric A. Hanushek and Ludger Woessmann, “Do Better Schools Lead to More Growth? Cognitive Skills, Economic Outcomes, and Causation,” NBER Working Paper 14633, National Bureau of Economic Research: Cambridge, MA, January 2009.

In addition to the direct measures of productivity, improvements in the skill levels of employees have been shown to improve other aspects and antecedents of firm performance. Improvements in task performance are micro measures of increased productivity, while impacts on co-worker performance, creativity, organizational citizenship behaviors, and counterproductive behaviors are precursors to improved organizational performance.

Training has been shown to improve task performance in both manufacturing and service occupations. An evaluation of training subsidies in Michigan shows that manufacturing firms that increased their training reduce scrap rates by 13 to 20 percent. This reduction is valued at about 0.5 to 0.9 percent of annual sales receipts.⁵⁰ A recent study of telephone operators in a large U.S. telecommunications company found that a 10 percent increase in informal training reduced average call time (their measure of productivity) by 0.03 percent to 0.16 percent.⁵¹ Evaluated using the mean hours of informal training and average wages for both the trainee and the employee providing the informal training, and accounting for skill depreciation and turnover, the average hour of informal training resulted in an ROI of 490 percent relative to receiving no informal training. Further, when differentiated based on employee skill level prior to training, the ROI ranged from 219 percent for high skill workers to 1,305 percent for low skill workers.

“Shaving fractions of seconds off phone calls may appear to have a very modest effect on productivity. However, in call centers that manage millions of transactions in a typical year, these small efficiency improvements translate into millions of dollars in savings.”⁵²

In addition to increasing the specific skills traditionally associated with employer-provided training, firms capture additional benefits from training their workforce.⁵³ Several studies have found clear evidence of productivity spillovers, i.e., the presence of a more skilled worker increases the performance of co-workers. This relationship has been demonstrated for workers of varying skill levels. For security analysts at investment banks, working with high-quality colleagues significantly increases the individual’s ability to maintain high levels of performance; and working with lower ability colleagues may hinder the performance of a high-ability worker.⁵⁴ Similarly, amongst supermarket cashiers, working in the presence

⁵⁰ Holzer, Block, Cheatham, and Knott. “Are Training Subsidies for Firms Effective?”

⁵¹ Liu and Batt, “The Economic Pay-Offs to Informal Training.”

⁵² Liu and Batt, “The Economic Pay-Offs to Informal Training.”

⁵³ Acemoglu and Pischke, “Why Do Firms Train?”; Acemoglu and Pischke, “Beyond Becker: Training in Imperfect Labor Markets,” *The Economic Journal*, February 1999; Acemoglu and Pischke, “The Structure of Wages and Investment in General Training,” *Journal of Political Economy*, June 1999; Barrett and O’Connell, “Does Training Generally Work?”; David H. Autor, “Why Do Temporary Help Firms Provide Free General Skills Training?” *The Quarterly Journal of Economics*, November 2001.

⁵⁴ Boris Groysberg and Linda-Eling Lee, “The Effect of Colleague Quality on Top Performance: The Case of Security Analysts,” *Journal of Organizational Behavior*, 29, 2008.

of a high-skilled coworker significantly increases the productivity of the cashier.⁵⁵ This productivity gain, however, is not sustained once the high performer leaves. These findings suggest that firms that accrue many high performers in critical jobs could have a sustainable competitive advantage over their rivals.

A meta-analysis of the relationship between education and a wide range of job performance measures found that more education leads to increases in individual task performance, employee creativity, and organizational citizenship behaviors, and to reductions in employee absences, substance abuse, and workplace aggression.⁵⁶ They conclude that individuals with higher levels of education have higher core task performance and are more effective in non-core activities such as creativity and cooperation. Additionally, higher educated workers engaged in fewer destructive behaviors.

As with the research on productivity increases due to training, most studies looking at other firm benefits to increasing the skills of its workforce do not pay special attention to new labor market entrants or recent graduates. However they do highlight the indirect ways investing in skills upgrading can benefit companies.

2. Providing educational opportunities improves timing, selection, and retention

As a result of the changes in the business environment—such as employers reporting increasing difficulty in finding qualified workers—coupled with changes in the organization of production and the development of unjust dismissal doctrines during the 1980s, demand for worker screening is rising.⁵⁷ Partnering with third party training organizations (temporary help firms, trade schools, and community and technical colleges) provides the employer with several pre-employment screening mechanisms and benefits, including: assurance the student has the desired level of mastery upon completion of employer-designed program; increased engagement, i.e., individuals who choose to participate reveal themselves as more dedicated/interested; exposure to work habits of students through employer participation during the training process; and reduction in search costs via a steady source of potential new employees.

Firms more sensitive to changing market demand for skills will focus on training/education that teaches skills that are useful in the workplace.⁵⁸ Frequent changes in the composition of jobs both within and across firms will require close relationships between schools and employers to ensure future workforce entrants are prepared for a variety of occupations. Further, there are often few transparent occupational

⁵⁵ Enrico Moretti, “Workers’ Education, Spillovers, and Productivity: Evidence from Plant-Level Production Functions,” *American Economic Review*, June 2004.

⁵⁶ Ng and Feldman, “How Broadly Does Education Contribute to Job Performance?”

⁵⁷ Autor, “Why Do Temporary Help Firms Provide Free General Training?”

⁵⁸ see Heckman, “Policies to Foster Human Capital.”

standards for the wide array of institutions offering training/education opportunities related to a specific occupation. Partnering with an institution will help employers alleviate these confusions: they will know (and can influence) the quality of new hires they are getting.⁵⁹ Additionally, continuous involvement by a firm can help ensure a steady pool of applicants with the appropriate level of skills.⁶⁰

To attract a higher skilled worker, employers can (and often do) simply offer a higher pay rate. But increasing the pay not only attracts the more skilled worker, it increases the overall pool of talent interested in the job. The employer is left with the difficult task of sorting through the applicant pool and identifying the most talented.

Offering training during the recruitment process is another way to attract a higher quality talent pool i.e., more able people acquire more skills, and can induce a potential employee to take a lower starting salary in exchange for higher wage growth potential.⁶¹ Assisting workers in obtaining formal education, whether through tuition assistance or other means, is particularly attuned to the self-selection argument, since the benefits of post-secondary education are likely the most obvious to (potential) employees.

The signaling allows the employer to capture a productivity premium before and during the education process. While the firm-provided assistance attracts above average workers, the firm pays the “going rate,” or average wage. If the information obtained is kept within the firm, they can pay the worker less than their productive value, since outside firms don’t see the worker’s full value. Schmidt and Hunter conclude that “the economic value of gains from improved hiring methods are typically quite large.”⁶²

In many instances, general skills and firm specific skills are complements (e.g., better analytical skills increase the productivity of someone working with databases). By being involved in the education process of the potential workforce, the employer can capture some of the returns to increased general skills. Firms can also learn information about the ability of their new hires during the training process—which they could not determine from the hiring process—and capitalize on the productive gains of these abilities. This private information allows the employer to hire a more productive worker, but still pay the market rate for the average worker. With responsibility to fill roles with certain skills, providing

⁵⁹ Robert I. Lerman, “Career Focused Education and Training for Youth,” in Harry J. Holzer and Demetra Smith Nightengale, eds., *Reshaping the American Workforce in a Changing Economy*, Washington DC: Urban Institute Press, 2007.

⁶⁰ Joseph Oberle, “Manpower Inc.: Training Because There’s No Other Way,” *Training*, March 1990.

⁶¹ Acemoglu and Pischke, “Beyond Becker: Training in Imperfect Labor Markets.”

⁶² Schmidt and Hunter, “The Validity and Utility of Selection Methods in Personnel Psychology.”

training/education can be more efficient than trying to find the workers who already have the skills in place.⁶³

Participation in training/education programs is also associated with lower voluntary and involuntary turnover. Lerman found “the more active the employer-school partnership, the more young people... held jobs at higher rates....”⁶⁴ Reid and Melrose investigated low skill workers who participated in an employer-sponsored post-secondary education program, finding that participants were more likely to stay with the company.⁶⁵ Employee interviews revealed that the reasons for staying were the ability to continue learning and increased opportunities for advanced training.

Tuition assistance and other forms of educational support also increase the tenure of employees. There is the obvious reason, i.e., individuals must remain with the employer to take advantage of the employee assistance programs. Completing an associate’s degree can easily take as many as four years if the employee takes classes on a part-time basis while working for the firm. But there are also other reasons to believe providing educational assistance will reduce turnover amongst participating employees. Offering assistance may not only attract better workers, but may also increase the likelihood of a quality fit between employee and employer. As Peter Cappelli notes, summarizing research he published in 2004, “...the results suggest that employees do not pay for tuition assistance through below market or training wages, the typical arrangement for funding general skills training. Instead, tuition assistance appears to select better quality employees who stay on the job longer....”⁶⁶

Relative to studies on the productivity benefits of training or schooling, many of these findings are more easily related to the new labor market entrants/recent graduates.

3. Investing in education to create new or expand existing markets

Macroeconomists have well documented the strong positive relationship between improved education and higher economic growth rates.⁶⁷ More recent work has emphasized the importance of cognitive skills—the positive effect of cognitive skills on economic growth dwarfs the relationship between years of

⁶³ Oberle, “Manpower Inc.: Training Because There’s No Other Way.”

⁶⁴ Lerman, “Career Focused Education and Training for Youth.”

⁶⁵ Maureen Reid and Mary Melrose, “Partnership in Skill Development and Credentialisation: Career Development from School to Work to Tertiary Study,” *Journal of Education and Work*, 17(3), 2004.

⁶⁶ Peter Cappelli, “Why Do Employers Pay for College?” *Journal of Econometrics* 121, 2004.

⁶⁷ Robert J. Barro, “Economic Growth in a Cross Section of Countries,” *Quarterly Journal of Economics*, May 1991; N. Gregory Mankiw, David Romer, and David Weil, “A Contribution to the Empirics of Economic Growth,” *Quarterly Journal of Economics*, May 1992; Alan B. Krueger and Mikael Lindahl, “Education for Growth: Why and for Whom?” *Journal of Economic Literature*, December 2001.

schooling and economic growth.⁶⁸ Improvements at both ends of the skill distribution have a positive effect on growth, and improvements within each end of the skill distribution are complementary.⁶⁹ Yet for most businesses the significant macroeconomic gains from increased education are too abstract to motivate action.

Looking at individuals and markets provides a clearer focus on the role of education in creating or expanding business opportunities. Two separate data sets in individual consumption show that education has no significant impact on expenditures for necessities, but an additional year of education increases non-necessity expenditures by about one percent.⁷⁰ Also, the characteristics of local markets (age, education, etc.) are more important for the distribution of “perishable” goods and services than non-perishable goods and services, which can be purchased from remote suppliers and shipped long distances.⁷¹

Increasing the education of a group of individuals has both a wealth effect and a knowledge effect. With more education generally comes higher earnings, and consequently higher wealth. Research has shown that individuals increase their consumption expenditures between two and eight cents for every dollar increase in their wealth.⁷² This wealth effect is stronger for more educated individuals. Respondents to the 2001 Federal Reserve Board Survey of Consumer Finances with “a college degree or certificate” are 16 percent more likely than those with “high school only” to self report a wealth effect (i.e., that their spending would increase with the value of their assets).⁷³

The knowledge effect on consumption, on the other hand, does not have near the universal outcome. For some goods, a more educated consumer is better. Research has shown that the probability of broadband access presence in a zip code increases with the average education level in that zip code;⁷⁴ active and

⁶⁸ Eric A. Hanushek and Dennis D. Kimko, “Schooling, Labor Force Quality, and the Growth of Nations,” *American Economic Review*, December 2000.

⁶⁹ Eric A. Hanushek and Ludger Woessmann, “Do Better Schools Lead to More Growth? Cognitive Skills, Economic Outcomes, and Causation,” NBER Working Paper 14633, National Bureau of Economic Research: Cambridge, MA, January 2009.

⁷⁰ Jonathan Gruber, “Unemployment Insurance, Consumption Smoothing, and Private Insurance: Evidence from the PSID and CEX,” *Research in Employment Policy*, 1998.

⁷¹ Joel Waldfogel, “The median voter and the median consumer: Local private goods and population composition,” *Journal of Urban Economics*, March 2008.

⁷² see references in Diane K. Schooley and Debra Drechnik Worden, “A Behavioral Life-Cycle Approach to Understanding the Wealth Effect,” *Business Economics*, April 2008.

⁷³ Diane K. Schooley and Debra Drechnik Worden, “A Behavioral Life-Cycle Approach to Understanding the Wealth Effect,” *Business Economics*, April 2008.

⁷⁴ James E. Prieger, “The Supply Side of the Digital Divide: Is There Equal Availability in the Broadband Internet Access Market?” *Economic Inquiry*, 41(2), April 2003.

passive stock market participation increases with education;⁷⁵ the number of restaurants increases within a zip code when the education level increases;⁷⁶ life insurance penetration is higher in markets with more educated citizens;⁷⁷ and more educated consumers are more responsive to new information.⁷⁸ For other goods, more educated consumers may decrease consumption. More educated individuals make less use of hospital emergency departments; are less likely to require assistance with credit defaults or bankruptcy;⁷⁹ a more educated locale has fewer fast-food restaurants.⁸⁰

4. The social aspects of investing in disadvantaged 16-26 year olds

Most empirical studies of the returns to education focus on the private returns to the worker and the firm. But business operates within larger communities and society. Many scholars have also argued that there are social returns to education. Milton Friedman wrote that “the gain from the education of a child accrues not only to the child or to his parents but to other members of the society.”⁸¹ These gains to other members of society include knowledge, technology, and productivity spillovers, reductions in criminal activity, improved health and education outcomes for their offspring, and increased civic participation.

Increases in education have been linked to greater diffusion of knowledge and technology, ultimately resulting in productivity spillovers. More educated individuals are more likely to be early adopters of technology and display greater innovative ability.⁸² Recent empirical work looks at the productivity of plants in different cities relative to the education level in each city.⁸³ In cities with an increase in the fraction of (4-year) college educated workers, productivity rises faster than in cities where education levels are unchanged. More detailed analyses support the argument that the higher productivity is derived from knowledge transfer. Productivity spillovers are largest within an industrial sector—increases in education in the high-tech sector of a city have a greater impact on high-tech plants than on low-tech

⁷⁵ Luigi Guiso, Michael Haliassos and Tullio Jappelli, “Household stockholding in Europe: Where do we Stand and Where do we Go?” *Economic Policy*, April 2003.

⁷⁶ Waldfogel, “The median voter and the median consumer.”

⁷⁷ Thorsten Beck and Ian Webb, “Determinants of Life Insurance Consumption across Countries,” World Bank Policy Research Working Paper 2792, February 2002.

⁷⁸ Jay P. Shimshack, Michael B. Ward, and Timothy K.M. Beatty, “Mercury Advisories: Information, Education, and Fish Consumption,” *Journal of Environmental Economics and Management*, March 2007.

⁷⁹ Paula Lopes, “Credit Card Debt and Default over the Life Cycle,” *Journal of Money, Credit, and Banking*, June 2008; Marina Pavan, “Consumer Durables and Risky Borrowing: The Effects of Bankruptcy Protection,” *Journal of Monetary Economics*, November 2008.

⁸⁰ Waldfogel, “The median voter and the median consumer.”

⁸¹ Milton Friedman, “The Role of Government in Education,” in *Economics and the Public Interest*, ed. Robert A. Solo, Rutgers University Press, 1995.

⁸² Gregory D. Wozniak, “Human Capital, Information, and the Early Adoption of New Technology,” *Journal of Human Resources*, Winter 1987.

⁸³ Moretti, “Workers’ Education, Spillovers, and Productivity.”; and Enrico Moretti, “Estimating the Social Return to Higher Education: Evidence from Longitudinal and Repeated Cross-Sectional Data,” *Journal of Econometrics*, 2004.

plants (and vice versa).⁸⁴ Additionally, increases in the proportion of college educated workers had a greater impact on the productivity of less-educated workers, with more-educated workers experiencing smaller productivity gains.⁸⁵

Reductions in criminal activity due to increased education have also been documented.⁸⁶ More education can reduce the likelihood of crime through various avenues: a higher wage earned as a result of more education increases the opportunity costs of incarceration and reduces the relative return to crime. More education can also increase a person's patience and risk aversion, making the immediate gratification of crime less appealing. There exists a significant negative relationship between education and criminal activity: an increase in a person's education level reduces the likelihood they will be arrested and the likelihood they will be incarcerated. This relationship is stronger for blacks than whites, suggesting a greater return for investing in disadvantaged groups.

Increasing the educational attainment of a woman who will later become a mother has the long-run benefit of indirectly improving the health and educational outcome of her children. More educated women tend to be healthier and seek neo-natal care earlier and more often during pregnancy.⁸⁷ More educated parents also tend to have higher educated children.⁸⁸ Further, there is evidence that children in communities where the young adults have higher education levels are more likely to seek additional education when they get older.⁸⁹

Finally, increased civic participation is an often touted external benefit of education in the United States. "[I]t is widely believed that education is an essential component of a stable democratic society."⁹⁰ Increases in education at the secondary and post secondary levels increase voter participation, support for free speech, and newspaper readership in the United States.⁹¹ More educated individuals are also more

⁸⁴ Moretti, "Workers' Education, Spillovers, and Productivity."

⁸⁵ Moretti, "Estimating the Social Return to Higher Education."

⁸⁶ Lance Lochner and Enrico Moretti, "The Effects of Education on Crime: Evidence from Prison Inmates, Arrests, and Self-Reports," *American Economic Review*, March 2004.

⁸⁷ Janet Currie and Enrico Moretti, "Mother's Education and the Intergenerational Transmission of Human Capital: Evidence from College Openings," *The Quarterly Journal of Economics*, November 2003.

⁸⁸ Barbara Wolfe and Robert Haveman, "Accounting for the Social and Non-Market Benefits of Education," in *The Contributions of Human and Social Capital to Sustained Economic Growth and Well-Being International Symposium Report*, ed. John F. Helliwell, Human Resources Development Canada and Organization for Economic Cooperation and Development, 2001.

⁸⁹ Donna Ginther, Robert Haveman, and Barbara Wolfe, "Neighborhood Attributes as Determinants of Children's Outcomes: How Robust Are the Relationships?" *Journal of Human Resources*, Autumn 2000; Daniel Aaronson, "Sibling Estimates of Neighborhood Effects," in *Neighborhood Poverty: Policy Implications in Studying Neighborhoods* Vol II, ed. J. Brooks-Gunn, G. Duncan, and L. Aber, New York: Russell Sage Foundation, 1997.

⁹⁰ Thomas S. Dee, "Are There Civic Returns to Education," *Journal of Public Economics*, 2004.

⁹¹ Dee, "Are There Civic Returns to Education."

socially and politically active. They have a higher propensity to engage in the political discourse, associate with a political group, and be involved in community issues.⁹²

As with many of the other studies surveyed for this analysis, those seeking to explain the community benefits of increasing education do not focus specifically on sub-baccalaureate post-secondary credentials. Education is often treated linearly, in terms of years of schooling completed; or treated dichotomously, comparing those with a high school diploma or less to those with more than a high school diploma. Specific returns to sub-baccalaureate credentials require further investigation.

⁹² Kevin Milligan, Enrico Moretti, and Philip Oreopoulos, "Does education improve citizenship? Evidence from the United States and the United Kingdom," *Journal of Public Economics*, 2004.

III. Can Businesses Be Persuaded to Invest in Postsecondary Credentialing?

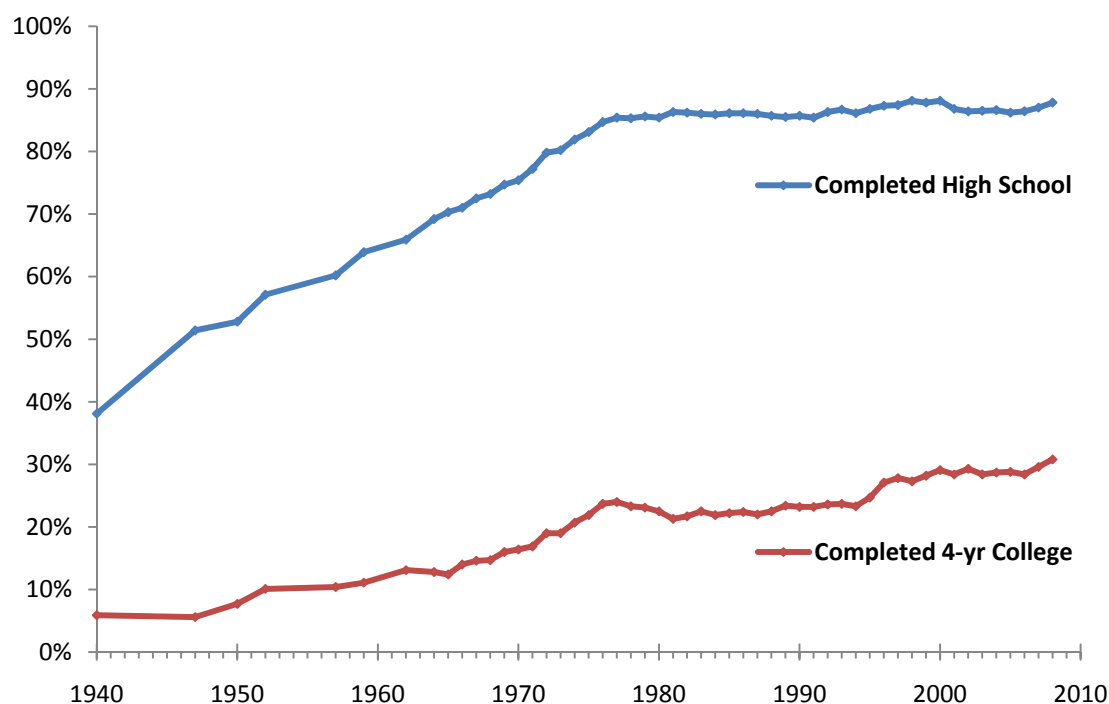
The housing collapse and financial market crisis that fueled the recession has reinforced the importance of focusing strategy on the long run success of the business. Investing in partnerships with third party training organizations focused on improving the skills of the future workforce is a long term solution to a firm's talent needs. Increasing the number of potential middle-skill workers improves the firm's ability to hire workers that meet the level of skill they need; and more workers with a given level of skill helps hold down the wage growth for that group.

The marketplace for middle-skill workers is becoming more strained. Firms increasingly are looking for workers with a post-secondary credential, and in many cases this does not require a traditional four-year degree. At the same time, shifts in demographics and immigration patterns are trending towards a slowdown in new workforce entrants with post-secondary credentials. Whether U.S. businesses should become involved in increasing the skills of tomorrow's worker or seek out the talent they need in other countries depends on a variety of factors. This paper highlighted arguments for business involvement in four main areas: (1) productivity gains, (2) talent management advantages, (3) market expansion, (4) and community improvements.

Existing research suggests there are substantial gains to individuals, businesses, and communities through the increase in the educational attainment of today's youth beyond high school. The direct returns to businesses investing in education are clear in regards to productivity gains, increased availability of skilled workers, and improvements in selection and retention. It is less clear that there is strong empirical evidence to support the argument that individual businesses can increase existing markets or gain entrance into new ones through investing in education. Further, while there is strong empirical evidence that increasing education leads to substantial community and social improvements, it is unclear whether businesses are able to capitalize on these improvements to the degree necessary to justify spending on education as a sound business investment for that reason alone.

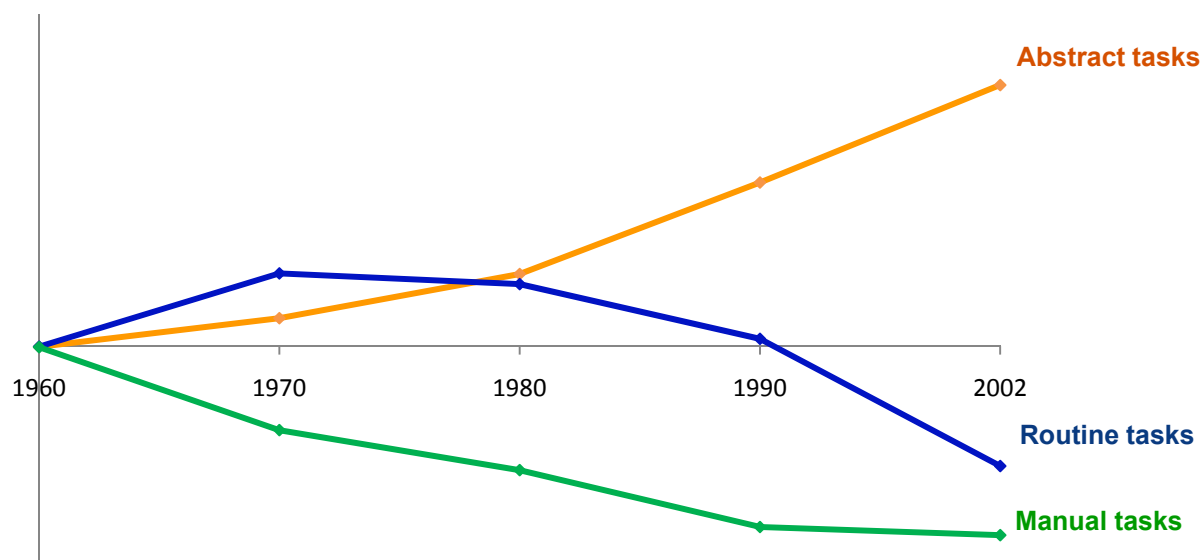
This review also highlighted the dearth of studies that focus on the sub-baccalaureate credential, and the lack of studies that focus on the under-26 age cohort. More extensive research in this area, particularly regarding the sub-baccalaureate credential, will further solidify and enhance the business case for investing in post-secondary credentials. In addition, future efforts to identify the most promising existing and new programs, to assess the scalability of such programs, and to share these models with the business community are necessary to significantly increase the role of businesses in educating tomorrow's workforce.

Chart 1: Percent of U.S. residents age 25-29 that completed high school or 4-year college



Source: U.S. Census Bureau, Education and Social Stratification Branch, Table A-2. “Percent of People 25 Years and Over Who Have Completed High School or College, by Race, Hispanic Origin and Sex: Selected Years 1940 to 2008.”

Chart 2: Task input of jobs in the U.S. workforce (1960 = baseline)



Source: David H. Autor, “Technological Change and Earnings Polarization: Implications for Skill Demand and Economic Growth,” presented at The Conference Board Innovation and Competitiveness Project Workshop, February 2007; and David Autor, Frank Levy, and Richard Murnane, “The Skill Content of Recent Technological Change: An Empirical Exploration,” *Quarterly Journal of Economics*, November 2003.

Stacked bar chart showing the percentage distribution of jobs across five zones (Job Zone 1 to Job Zone 5) from Q3 2006 to Q3 2009. The chart shows a general trend of decreasing Job Zone 1 and Job Zone 2 percentages, and increasing Job Zone 3 and Job Zone 4 percentages over time.

Quarter	Job Zone 1	Job Zone 2	Job Zone 3	Job Zone 4	Job Zone 5
Q3 2006	4.0%	20.2%	34.2%	32.7%	9.0%
Q4 2006					
Q1 2007					
Q2 2007					
Q3 2007					
Q4 2007					
Q1 2008					
Q2 2008					
Q3 2008	3.9%	18.9%	34.6%	32.2%	10.3%
Q4 2008					
Q1 2009					
Q2 2009					
Q3 2009	4.1%	20.0%	33.6%	27.9%	14.4%

Chart 4: Percentage of available online ads in job zone 3 by state: Q3 2009

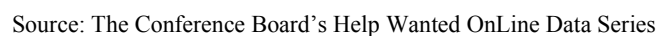
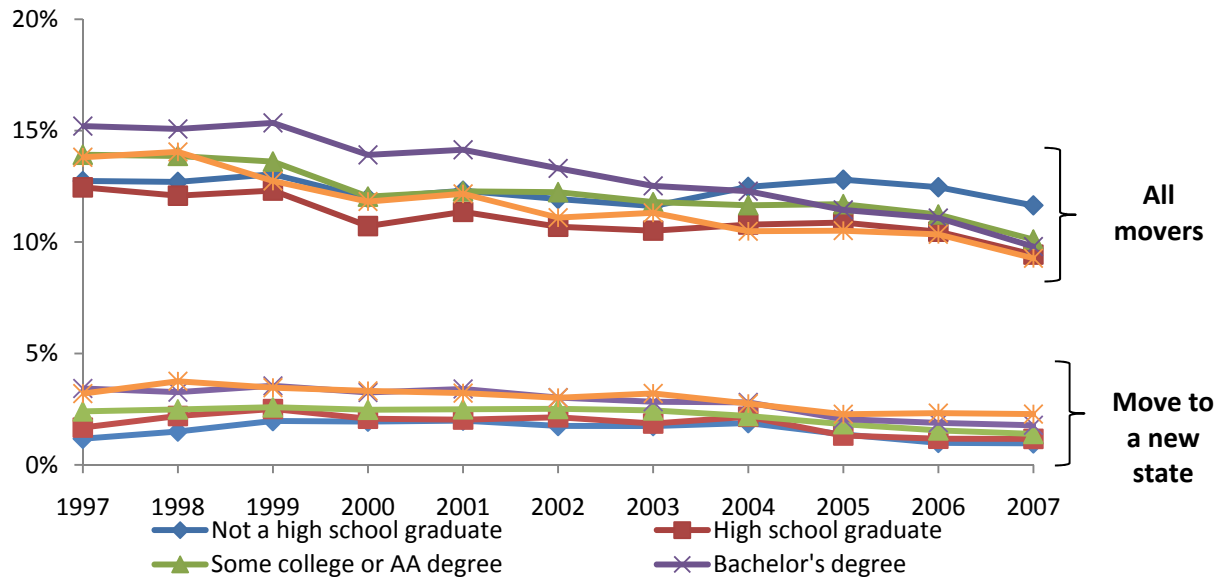
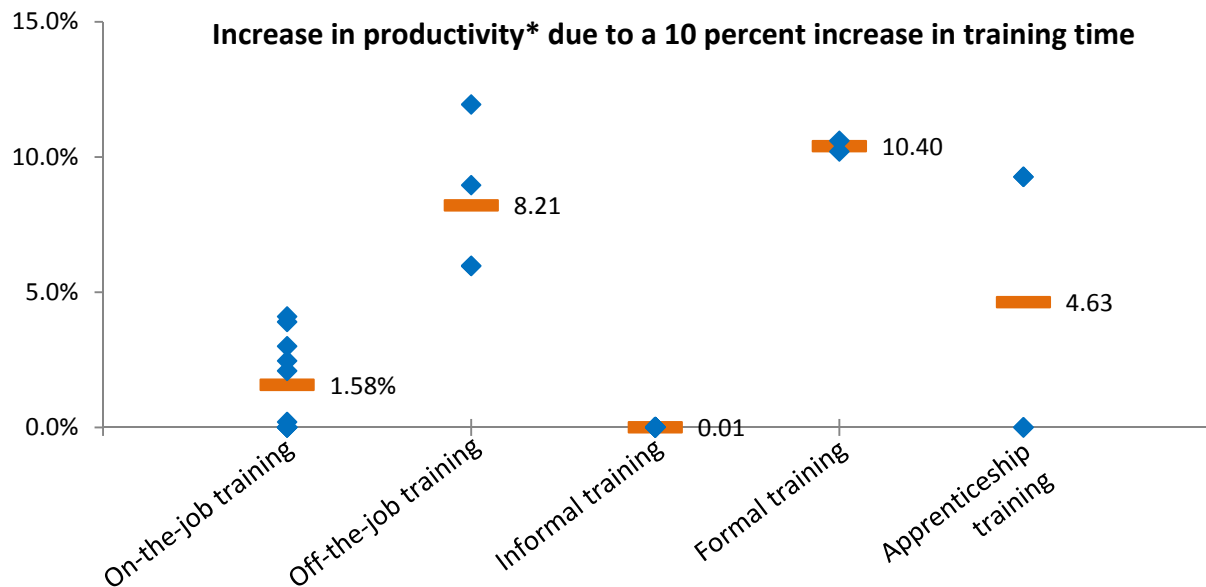


Chart 5: Percentage of persons aged 25+ that move in a given year, by education level



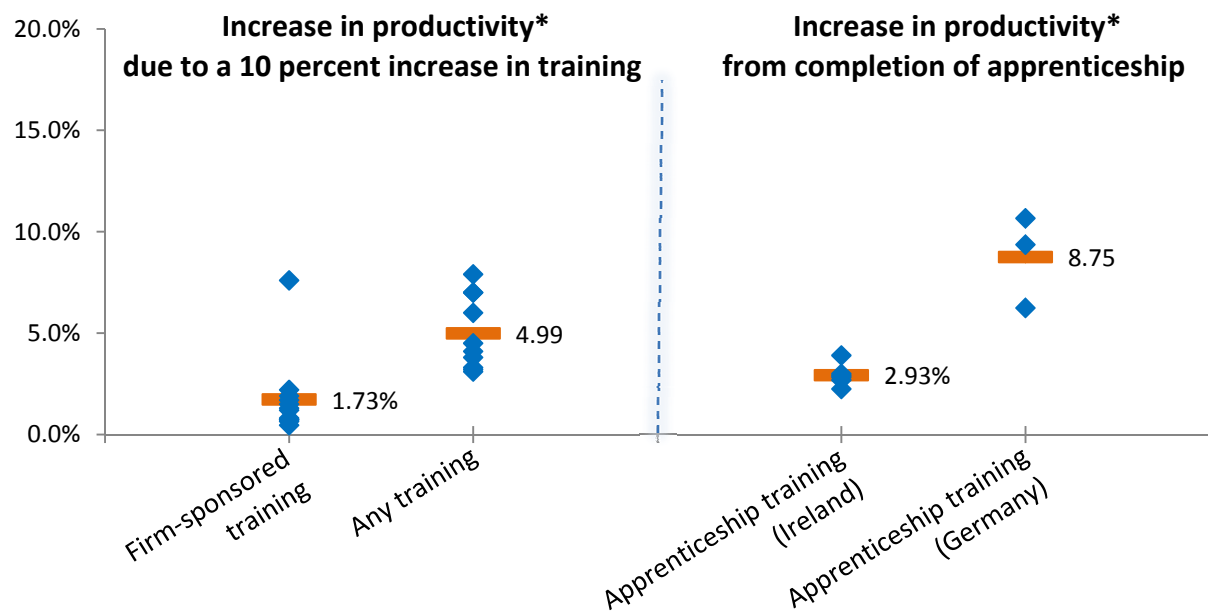
Source: U.S. Census Bureau, Housing and Household Economic Statistics Division, Journey-To-Work & Migration Statistics Branch, Table 1. "General Mobility, by Race and Hispanic Origin, Region, Sex, Age, Relationship to Householder, Educational Attainment, Marital Status, Nativity, Tenure, and Poverty Status: 2007 to 2008"

Chart 6: Productivity gains to training in U.S. firms



* Productivity measures vary by study, ranging from manager assessments on a numerical scale to financial measures such as output per employee. Where no productivity measure is present, wage growth is multiplied by 7.3 (the average ratio between productivity growth and wage growth) to approximate productivity growth. See Appendix 2 for the list of studies included in this chart.

Chart 7: Productivity gains to training in European firms



* Productivity measures vary by study, ranging from manager assessments on a numerical scale to financial measures such as output per employee. Where no productivity measure is present, wage growth is multiplied by 7.3 (the average ratio between productivity growth and wage growth) to approximate productivity growth. See Appendix 2 for the list of studies included in this chart.

Appendix 1: Identifying Ads for “Middle-Skill” Jobs in The Conference Board’s Help Wanted OnLine Data Series™

The Conference Board Help-Wanted OnLine Data Series provides a look at the volume and types of jobs being advertised by employers on web-based job boards. While job ads are not a direct measure of job vacancies, they are one measure of employers’ demand for labor. It is important to the central argument of this paper to determine just how great the demand is for workers with varied levels of education.

In order to identify the education distribution of online ads, The Conference Board’s Help Wanted OnLine Data Series⁹³ (HWOL) was matched to the O*Net Job Zones⁹⁴ classification based on the occupation assigned to the ad. Because the HWOL database is generated from a variety of online job boards, there is no requirement nor consistency across boards in regards to posting minimum education/skill requirements for each online ad. Wanted Technologies, who creates the underlying database that produces the HWOL, assigns an occupation to each ad. The occupations are from the Standard Occupational Classification system, which allows for a consistent assignment of skill level for each job ad.

In addition to the O*Net Job Zones, both the O*Net Education and the Bureau of Labor Statistics Education classification systems were considered (see Appendix Table A2). Given the purpose of using HWOL to identify the relative demand for jobs that can be filled by individuals following completion of a sub-baccalaureate credential, the O*Net Job Zones classification has a notable advantage over using an education classification system. The Job Zones consider, in addition to average education level of current workers in an occupation, occupational characteristics, related work experience, training requirements, and where the occupation falls within a “career ladder.” In contrast, the O*Net education levels are based primarily on surveys of current workers in each occupation. The modal education level amongst those surveyed is assigned to each occupation. As a result, within the O*Net system about 25% of occupations have education levels that do not mirror their Job Zone—that is, the five education groups are not an exact match to the five Job Zones (e.g., CEOs are assigned education level 4, bachelor’s degree, but are in Job Zone 5).

The BLS classification, in contrast, is “intended to reflect the most significant source of education or training.”⁹⁵ Like with the O*Net education classification, the current BLS classification does not allow for a combination of education and experience in an occupation. As a result, jobs which require a bachelor’s

⁹³ The Conference Board Help-Wanted Online Data Series™ measures the number of new, first-time online jobs and jobs reposted from the previous month on more than 1,200 major Internet job boards and smaller job boards that serve niche markets and smaller geographic areas. Like The Conference Board’s long-running Help-Wanted Advertising Index of print ads (which was published for over 55 years and discontinued in July 2008), the new online series is not a direct measure of job vacancies. The level of ads in both print and online may change for reasons not related to overall job demand. Information on the database, methodology, and technical notes on this new series are available on The Conference Board website at:

www.conference-board.org/economics/helpwantedOnline.cfm. The underlying data for this series is provided by Wanted Technologies Corporation.

⁹⁴ The Occupational Information Network (O*NET) is a relatively new database sponsored by the US Department of Labor/Employment and Training Administration, designed to replace the Department of Labor’s Dictionary of Occupational Titles. The O*NET database is designed to provide greater depth and breadth in describing occupations than the Dictionary of Occupational Titles, and provide a new conceptual framework that addresses the many changes in the economy. The Job Zone system classifies each occupational unit into one of five Job Zones, based on the level of required preparation. Each Job Zone has five criteria which are used to assign an occupation unit to the Job Zone system: overall experience, job training, job zone examples, Specific Vocational Preparation score, and education required (see Appendix Table A1). For more information on O*NET or the Job Zones, visit

<http://www.onetcenter.org/>

⁹⁵ <http://www.bls.gov/emp/edunotice.htm>

degree plus significant on the job experience (e.g. CEOs) are treated the same as jobs which can be filled by recent college graduates.

The focus in this paper is on highlighting the immediate need for workers with post-secondary credentials. Making use of the average education level along with the experience and training common within an occupation provides a better understanding of who can fill the jobs. The O*Net Job Zone 3 best captures those occupations that can be readily filled by individuals who complete some form of post-secondary credentialing.

As mentioned earlier, about 25% of the occupations are not a direct match between their assigned O*Net education level and their Job Zone (see Appendix Table A3).⁹⁶ For example, occupations such as computer support specialist, construction and building inspectors, (environmental, industrial, and mechanical) engineering technicians, and brokerage clerks are classified by the O*Net system in education group 4 (“college”), but fall into Job Zone 3. Similarly, occupations such as police detectives, chefs and head cooks, and nuclear power reactor operators are classified in the O*Net education group 2 (“high school”) but fall in Job Zone 3. Each of these occupations requires some level of training beyond high school that can be attained with a certificate or associate’s degree.

Still, as an approximation to the number of jobs available, this distinction between the education groups and the Job Zones is only important if the number of ads differs between the two groups. This decision is not insignificant (Appendix Table A4). In the first quarter of 2009 approximately 20% of the online ads were in occupations classified as “some college” (i.e. sub-baccalaureate) and 40% were in “college (i.e. bachelor’s degrees) occupations, compared to 35% of the ads in Job Zone 3 occupations and 30% of the ads in Job Zone 4 occupations. Moreover, these numbers are fairly consistent over time (for example, see Chart 3).

It is defensible to choose either the education assignments or the Job Zone assignments to identify the demand for workers with sub baccalaureate post-secondary credentials. The Job Zones classification considers average education level of current workers in an occupation, occupational characteristics, related work experience, training requirements, and where the occupation falls within a “career ladder.” In addition, a manual review reveals several occupations that fall into Job Zone 3 which can be obtained by a worker with a post-secondary credential or associate’s degree, yet are currently assigned to education group 2 (“high school”) or education group 4 (“college”). Because of these two factors, in this paper the demand for workers with sub baccalaureate post-secondary credentials is measured by the number of online ads assigned to occupations in Job Zone 3.

⁹⁶A similar discrepancy exists between the BLS education groups and the O*Net Job Zones. In contrast, there exists little discrepancy between the BLS education codes and the O*Net education codes: 628 of the 732 six-digit occupations match, a success rate of 93%. The following discussion comparing the O*Net education codes to the O*Net Job Zones can also be had comparing the BLS education codes to the O*Net Job Zones, with similar results.

Appendix Table A1 - [O*NET Job Zones](#)

Job Zone One: Little or No Preparation Needed

Overall Experience	No previous work-related skill, knowledge, or experience is needed for these occupations. For example, a person can become a cashier even if he/she has never worked before.
Job Training	Employees in these occupations need anywhere from a few days to a few months of training. Usually, an experienced worker could show you how to do the job.
Job Zone Examples	These occupations involve following instructions and helping others. Examples include taxi drivers, amusement and recreation attendants, counter and rental clerks, cashiers, and waiters/waitresses.
SVP Range	(Below 4.0)
Education	These occupations may require a high school diploma or GED certificate. Some may require a formal training course to obtain a license.

Job Zone Two: Some Preparation Needed

Overall Experience	Some previous work-related skill, knowledge, or experience may be helpful in these occupations, but usually is not needed. For example, a teller might benefit from experience working directly with the public, but an inexperienced person could still learn to be a teller with little difficulty.
Job Training	Employees in these occupations need anywhere from a few months to one year of working with experienced employees.
Job Zone Examples	These occupations often involve using your knowledge and skills to help others. Examples include sheet metal workers, forest fire fighters, customer service representatives, pharmacy technicians, salespersons (retail), and tellers.
SVP Range	(4.0 to < 6.0)
Education	These occupations usually require a high school diploma and may require some vocational training or job-related course work. In some cases, an associate's or bachelor's degree could be needed.

Job Zone Three: Medium Preparation Needed

Overall Experience	Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.
Job Training	Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers.
Job Zone Examples	These occupations usually involve using communication and organizational skills to coordinate, supervise, manage, or train others to accomplish goals. Examples include funeral directors, electricians, forest and conservation technicians, legal secretaries, interviewers, and insurance sales agents.
SVP Range	(6.0 to < 7.0)
Education	Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree. Some may require a bachelor's degree.

Job Zone Four: Considerable Preparation Needed

Overall Experience	A minimum of two to four years of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.
Job Training	Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.
Job Zone Examples	Many of these occupations involve coordinating, supervising, managing, or training others. Examples include accountants, human resource managers, computer programmers, teachers, chemists, and police detectives.
SVP Range	(7.0 to < 8.0)
Education	Most of these occupations require a four - year bachelor's degree, but some do not.

Job Zone Five: Extensive Preparation Needed

Overall Experience	Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. For example, surgeons must complete four years of college and an additional five to seven years of specialized medical training to be able to do their job.
Job Training	Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.
Job Zone Examples	These occupations often involve coordinating, training, supervising, or managing the activities of others to accomplish goals. Very advanced communication and organizational skills are required. Examples include librarians, lawyers, aerospace engineers, physicists, school psychologists, and surgeons.
SVP Range	(8.0 and above)
Education	A bachelor's degree is the minimum formal education required for these occupations. However, many also require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree).

For more details and background on the O*NET Job Zones, see “Procedures for O*NET Job Zone Assignment,” The National Center for O*NET Development, March 2008 (<http://tiny.cc/LXtaB>).

Appendix Table A2: O*Net and BLS Education Codes

BLS Education Code	O*Net Education Code	O*Net Job Zones
1. Short Run on Job Training	1. Less than High School	1. Little or no Preparation Needed
2. Medium Term on Job Training	2. High School	2. Some Preparation Needed
3. Long Term on Job Training	3. Some College	3. Medium Preparation Needed
4. Work Experience	4. College	4. Considerable Preparation Needed
5. Vocational	5. Grad School	5. Extensive Preparation Needed
6. Associates		
7. Bachelors		
8. Bachelors + Experience		
9. Masters		
10. Doctorate		
11. Professional		

Appendix Table A3: Number of Occupations in O*Net Education groups and Job Zones

O*Net Education groups	Number of occupations	O*Net Job Zones	Number of occupations
1. Less than High School	56	1. Little or no Preparation Needed	60
2. High School	255	2. Some Preparation Needed	341
3. Some College	243	3. Medium Preparation Needed	133
4. College	142	4. Considerable Preparation Needed	169
5. Grad School	114	5. Extensive Preparation Needed	104

Appendix Table 4: Distribution of Online Ads in Q1 2009, by O*Net education and Job Zones

O*Net Education groups	Percent of online ads	O*Net Job Zones	Percent of online ads
1. Less than High School	3.0%	1. Little or no Preparation Needed	3.6%
2. High School	28.5%	2. Some Preparation Needed	18.4%
3. Some College	20.9%	3. Medium Preparation Needed	34.6%
4. College	38.5%	4. Considerable Preparation Needed	30.3%
5. Grad School	9.1%	5. Extensive Preparation Needed	13.0%

Appendix 2: Empirical Studies of the Productivity Gains from Training

U.S. Studies

- Barron, John M., Mark C. Berger, and Dan A. Black. "Do Workers Pay for On-the-Job Training?" *The Journal of Human Resources* 34, no. 2 (1999): 235-252.
- Barron, John M., Dan A. Black, and Mark A. Loewenstein. "Job Matching and On-the-Job Training." *Journal of Labor Economics* 7, no. 1 (1989): 1-19.
- Bartel, Ann P. "Productivity Gains from the Implementation of Employee Training Programs." *Industrial Relations* 33, no. 4 (1994): 411-425.
- Black, Sandra E., and Lisa M. Lynch. "Human-Capital Investments and Productivity." *American Economic Review: Technology, Human Capital, and the Wage Structure* 86, no 2 (1996): 263-267.
- Holzer, Harry J., Richard Block, Marcus Cheatham and Jack Knott. "Are Training Subsidies for Firms Effective? The Michigan Experience." *Industrial and Labor Relations Review* 46, no.4 (July 1993): 625-636.
- Liu, Xiangmin and Rosemary Batt. "The Economic Pay-offs to Informal Training: Evidence from Routine Service Work." *Industrial and Labor Relations Review* 61, no. 1 (2007): 75-89.
- Lynch, Lisa M. "Private-Sector Training and the Earnings of Young Workers." *The American Economic Review* 82, no. 1 (1992): 299-312.

European Studies

- Acemoglu, Daron and Jörn-Steffen Pischke. "Why Do Firms Train? Theory and Evidence." *The Quarterly Journal of Economics* 113, no. 1 (1998): 79-119.
- Ballot, Gérard, Fathi Fakhfakh, and Erol Taymaz. "Who Benefits from Training and R&D, the Firm of the Workers?" *British Journal of Industrial Relations* 44 no. 3 (2006): 473-495.
- Barrett, Alan, and Philip J. O'Connell. "Does Training Generally Work? The Returns to In-Company Training." *Industrial and Labor Relations Review* 54, no. 3 (2001): 647-662.
- Conti, Gabriella. "Training, productivity, and wages in Italy." *Labor Economics* 12 (2005): 557-576.
- Dearden, Lorraine, Howard Reed, and John Van Reenen. "The Impact of Training on Productivity and Wages: Evidence from British Panel Data." *Oxford Bulletin of Economics and Statistics* 68, no. 4 (2006): 397-421.
- Zwick, Thomas. "The Impact of Training Intensity on Establishment Productivity." *Industrial Relations* 45, no. 1 (2006): 26-46.