Job Market Signaling: An Active Learning Approach for Teaching Education and Employment

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Economics classrooms are typically teacher-centered, textbook-driven, and often dominated by chalk-and-talk methodology. This paper advocates for an active learning approach and offers a lesson plan for key concepts. More specifically this lesson uses the economic concept of job market signaling to teach important economic content. Job market signaling is a process that matches workers and employers within labor markets. It occurs when potential employees convey information about their productivity to employers through academic credentials. An academic credential—for example, a college degree—conveys information valuable to both parties. It benefits the employer by indicating job skills and productivity; it benefits the employee because it increases the likelihood of gaining employment at higher wages. Earning academic credentials, thus, is important for success in the labor market. For this reason, it is a useful concept to teach students. By participating in a simulated competitive labor market as employers and potential employees, students learn about the links between education, productivity, income, and employment. As potential employees in this exercise have varying levels of education, this lesson also conveys important information for students concerning their own decisions about pursuing post-secondary education.

Keywords*:* Active Learning, Economics, Education, Employment, Unemployment, Income, Productivity, Signaling

Introduction

Economics classrooms are sometimes stereotyped as teacher-centered and textbook driven. Many have seen Ben Stein's character drone on about economics in *Ferris Bueller's Day Off*, while students sit passively and sleepily at their desks (Hughes & Jacobson, 1986). Too often, students can relate to similar classroom experiences. Social studies classrooms too often offer, "little intellectual engagement, dominance of teachers and textbooks, and minimal problem solving or critical thinking" (Wilson, 2001, p. 530). In many cases, teachers do not lack creativity or ambition; but, in the current climate of accountability, they make logical, pragmatic compromises by using the efficiency of lecture (Grant 2003; Paxton & Wineburg, 2000), and many economic educators prefer these methods because they perceive them to be cost-effective in terms of time and resources spent delivering content (Becker & Watts, 2001).

The chalk and talk method referenced by Becker and Watts (2001) typically involves lecture interspersed with writing key words and with drawing graphs, diagrams, and charts on a chalkboard or whiteboard. Research suggests economists are more likely to use lecture-based teaching methods than instructors in other fields, and students often rate economics instructors lower than other instructors (Allgood, Bosshardt, van der Klaauw & Watts, 2004; Becker & Watts, 2001). Recently, leaders in the economic education community, however, have been promoting the use of more active learning methods of teaching (Becker, Watts & Becker, 2006).

Active learning lessons provide students with the opportunity to learn essential content while engaging in interactions and simulations that help teach the context of economics. Many

interactive economics lessons, for example, have students engage in market or trade-based activities (context) while learning about the economics of markets and trade (content). Economic education research suggests interactive teaching methods are better suited to teach economic content, and students are more likely to internalize the content and "think like an economist" (Siegfried et al., 1991, p. 199) long after they leave the classroom. The benefits of active learning are well summarized by Nancy Walker Perry et al. (1996), "The active learning process transcends basic comprehension and memorization, focusing instead on the examination, analysis, evaluation, and application of course-related concepts" (p. 77). Using discussion and interaction also helps decenter the monopoly of authority that students perceive in their teachers and textbooks (Bain, 2006). As in economics, monopolies exist in the classroom because there are barriers to competition; in this case the barriers are often meant to maintain teacher-centered classroom control. Teachers who include more interaction and bring multiple sources and points of view into the discussion break down this perception of monopoly. In this case, more interaction by more classroom participants helps improve the educational outcome.

Defining active learning precisely is not an easy task. For John Dewey (1922), learning by definition was an active process. In his words, learning is "something which the individual does when he studies. It is an active, personally conductive affair" (Dewey, 1922, p. 390). Active learning can be defined as "anything that involves students in doing things and thinking about the things they are doing" (Bonwell & Eison, 1991, p. 19). Active learning, as described by Charles Bonwell and James Eison (1991), can utilize a variety of teaching methods, all of which involve the student in the learning process to greater extent than more traditional approaches. These methods include low risk activities such as think-pair-share and group discussions, as well as higher risk activities such as: role-play, simulation, and classroom debate. While a precise definition of active learning is difficult to identify, it might be helpful to utilize Supreme Court Justice Potter Stewart's often-repeated statement, "I know it when I see it." (Jacobellis v. Ohio, 1964, para. 47).

It is commonly said students retain approximately 10% of what they read, 20% of what they hear, but up to 90% of what they do and say (Stice, 1987). Active learning has been shown to result in significant increases in learning and retention (Barr & Tagg 1995; Brock & Cameron 1999; Frederking 2005). In addition to gains in learning and retention, students enjoy the learning process more when engaged in active learning (Ciliotta-Rubery, Levy, & Levy 2000; Newman & Twig 2000; Kathleene & Choate 1999). One particular type of active learning is the classroom simulation. Simulations provide a unique opportunity for students to experience the real-life situations they might face outside the classroom, with the ability to engage in risk-taking within in the safety of the classroom (DeLeon, 2008). Classroom simulations have been shown to result in greater student retention and student engagement even those one-session classroom simulations where students have little background in the specific discipline (Baranowski, 2006; Baranowski & Weir, 2010). The evidence points to active learning providing classroom instruction that is both popular and effective.

One of the most important educational outcomes, and perhaps one of the most obvious, is the accumulation of skills for successful employment. Teaching the economics of the labor market, then, is an especially relevant and therefore, potentially compelling subject in which to educate students. The economic concept of *job market signaling*, more specifically, gives educators an unique opportunity to teach important economic content related to the labor market,

such as: the relationship between educational attainment and success in the labor market; how wages and income are determined in the labor market, and why some workers are offered employment while others remain unemployed. Job market signaling conveys to students the important role education has in gaining employment as well as income. As a concept, job market signaling also provides a great opportunity to incorporate active learning strategies in the classroom.

Economic Content

Economists think of labor markets much like they think of the markets for goods and services. There are buyers and sellers of labor just as there are buyers and sellers of goods. The buyers in labor markets are employers seeking potential employees to work at their firms (businesses), and the sellers in labor markets are potential workers who are looking for jobs. As in other markets, there is a price. In the case of labor markets, the price is a wage paid to workers (Mankiw, 2012). Employers seek workers who are highly productive because, given the same inputs, more-productive workers will produce more goods and services than less-productive workers will. Producers (employers) can sell these extra goods and services for money, and the value of the extra goods produced and sold means additional revenue (and perhaps a profit) for the firm (Krugman & Wells, 2006).

Economic models explain the role of education in labor markets in two similar, but distinct, ways. The first focuses on human capital accumulation. In this more typical model, the primary economic purpose of education is the development of skills and aptitudes that enhance employability and worker productivity (Gruber, 2005). Firms in this model seek productive workers and are willing to pay higher wages to those with more skills. Individuals are willing to invest in education because it increases their human capital, making them more employable in the labor market thus resulting in higher wages, on average (Kolesnikova, 2010).

While productivity is very important to employers, it is difficult to determine which workers are more productive than others during the hiring process (Borjas, 2013). Employers have an information problem. The second model, known as job-market signaling, focuses on education as a screening device used by employers. In his groundbreaking research in this area, which led to the 2001 Nobel Prize in Economic Sciences, Michael Spence (1973) compares hiring an employee to a lottery because it is not known until after the decision whether there will be a payoff. Job-market signaling is an important process that helps more effectively match workers and employers within labor markets (Stiglitz, 1975). Signaling occurs when potential employees convey information about their productivity to employers through academic credentials (Spence, 2002). Imagine a prospective employer is given two nearly identical applications from unknown job candidates, one with a college degree and one with only a high school diploma. The employer will likely assume the candidate with a college degree has more qualitative and quantitative job skills and should be more productive (Jaeger & Page, 1996). For the employer, the greater potential productivity of the applicant with the college degree increases the likelihood of earning higher profits. As firms seek higher profits, they compete with other employers for these productive but relatively scarce employees and bid up their wages (Frank & Bernanke, 2007). As a result, the model suggests employees with more education are more productive and will, on average, earn higher wages in labor markets (McConnell, Brue & Flynn, 2012; Kolesnikova, 2011). Research has found the relationship between productivity and worker compensation in the United States is, on average, relatively strong and stable (Anderson, 2007;

Feldstein, 2008). Again, the academic credential (a college degree) conveys valuable information to the employer about the applicant's job skills and productivity. The academic credential is valuable to the employee because it increases the likelihood of gaining employment at higher wages.

This lesson will utilize both models to teach the value of education in labor markets. For workers, education serves an important human capital development function that enables them to find employment and earn higher incomes. For society, human capital development is vital to continued increases productivity that results in economic growth and rising living standards (Kolesnikova, 2010). For employers, the roles of academic credentials play a vital role in providing the information necessary to match workers with jobs.

Teaching Labor Markets Using Active Learning Methodology

This lesson introduces the economic concept of job market signaling through an active learning classroom activity to help students build an understanding of the relationships between: (1) education and productivity, (2) productivity and income, and (3) education credentials and success in labor markets. The classroom activity is followed by classroom discussion during which students identify the difference in the unemployment rate for those with and without a college education and general differences in income based on varying levels of education. These concepts play an important role in communicating to students the value of acquiring post-secondary education.

The activity described in this lesson involves two rounds in which some students act as potential employees with different levels of productivity and other students act as employers seeking highly productive employees. In round one, the productivity of potential employees is hidden. Employers offer jobs and wages without this key information. In round two, potential employees use a code to signal their productivity to employers who use the information in their hiring decisions. In the lesson debrief, students learn that the code represents an academic credential and that academic credentials serve as a key method of signaling productivity to prospective employers in labor markets. As such, students learn the value of pursuing post-secondary education and earning academic credentials.

Classroom Activity Description

Before teaching the activity, the teacher should copy and cut a sufficient number of cards (one card per student) in Appendix A (Round 1 Cards) and seal each card in an envelope. The same number of cards from Appendix C (Round 2 Cards) should be copied and cut, but not placed in envelopes. Three copies of Appendices B, D, and E should be produced. Figures A and B should be placed on a slide to be projected for the entire class to see. The exercise will likely take 30 to 40 minutes of class time.

1. Divide the students into two groups: employers and potential employees. Select three volunteers to act as employers seeking workers and ask the remaining students to participate as potential employees seeking employment. Distribute sealed envelopes containing cards to potential employees.
2. Explain to students that firms (businesses) earn profits if they can sell the goods and services they produce at a price that is higher than their cost of producing the good. If a firm can produce a good for $3 (cost of production) and sell it for $5, it earns $2 per unit as a profit. To keep the simulation simple, assume that labor is the only cost of production. To ensure the profit incentive that

drives markets is represented in the classroom simulation, offer an incentive to the employer who earns the highest profit in each round of the simulation. This could be extra credit points, candy, or pencils. These same incentives could be offered to potential employees who earn the highest wages in each round.

3. Explain to employers that they should be willing to pay a wage for labor that reflects the employee's ability to produce goods. If a worker creates $23 worth of extra revenue for the firm, employers would be willing to pay up to $23 for that employee's labor, but not more. (Paying any more would mean losing money and would put the employer out of business in the long-run.) If a worker creates only $7 per hour of extra revenue, the firm would only be willing to pay $7 per hour (at most) to that worker. Of course, employers earn a profit if they can hire employees who agree to work at a wage that is less than the extra revenue their labor produces.
4. To begin round one, tell employers they can hire any number of employees, but they will earn the highest profits if they are able to hire the most-productive workers from the group of prospective employees, whose productivity varies widely. The note inside the envelope indicates each worker's productivity, but it will remain hidden in round one. Tell employers they can pay from $7 (minimum) to $23 (maximum) per hour. At this point, the employer has no way of knowing the skill levels of the workers. Tell the students that the productivity of workers varies greatly, because employers have no information about worker productivity, they will likely offer all workers similar, but low, pay to increase their chances of earning profits. As they negotiate their wage, employees will likely ask for high wages (towards the $23 maximum). There are many employees, and few employers; the lack of productivity information will likely lead to confusion at first, and low wages will then dominate the market. Some workers will likely not be hired, and they will represent the unemployed. Tell the students that the Bureau of Labor Statistics (BLS) defines a person as unemployed if they are over 16 years old, not institutionalized, not currently employed, and actively seeking a job.
5. At the completion of round one, tell employees to open their envelopes and reveal their productivity numbers to their employer. Give employers a copy of Appendix B (Employer Worksheet Round 1) and tell them to complete Table 1 by entering 1) productivity information from the employee cards and 2) the wages agreed to in the simulation into the formula. Tell them then to calculate a profit number. Some employers might experience profits and others losses, depending on the distribution of high- and low-productivity workers. Employers and employees will discover that some workers may have been overpaid for their labor (based on productivity), while others were underpaid. Tell the students that knowing information regarding worker productivity will be useful (for both sides) in the negotiation strategies in round two. If you offered incentives such as extra credit or candy, pay out the round one prize at this point.

6. Debrief round one. Ask employers why they did or did not earn profit in this round. Remind students that the business will earn a profit if the value of the goods produced is higher than the wages paid to employees. Ask employers why it would have been helpful to know each worker's productivity *before* they hired workers. Ask employees if they are satisfied with the wages they were offered, given the information on their cards. Ask why the information on the card would be useful to both employers and employees. Explain that employers would find the information useful in determining an appropriate wage to offer employees, while improving the chances of earning a profit. Employees would find the information useful in negotiating a wage that is related to their skill level (as indicated by productivity). This will lead to less confusion in the labor market and better matching between the two groups. At the end of the discussion, collect worker cards and envelopes and set aside.
7. At the beginning of round two, randomly distribute one card from Appendix C (Round 2 Cards) to each potential employee. These cards have two letters (DO, HS, AA, BA, or MA) at the top. Tell all students (employers and employees) these letters hold key information about productivity. Tell potential employees to hold their cards so that potential employers can see the letters. In other words, workers should signal employers by flashing their cards in the direction of employers. Give employers a copy of Appendix D (Employee Productivity) and tell them to seek information about the two letters employees are signaling. Employers should be given time to process and discuss the information on the card. Remind employers of the relationship between employee productivity and employee wages and that they must earn a profit. Tell employers to bid for employees within a wage range of $7 (minimum) to $23 (maximum). Employers will likely compete and bid higher wages for workers with more education due to higher productivity.
8. Some workers with the lowest skill level may not be hired because they are not productive enough and thus will be unemployed. Workers with “DO” produce only one widget, earning $5 of revenue for the firm. Because the minimum wage is $7, these workers will not find employment because an employer would lose money by employing them. Meanwhile, workers with an MA card can produce six widgets or $30 of revenue for the firm. As the firm can pay up to $23, these employees generate $7 in profit for the firm and will be snatched up quickly by employers. End the round after several minutes.
9. At the completion of round two, employers use the information on Appendix D (Employee Productivity) to enter the productivity number and agreed wage on their worksheet Appendix E (Employer Worksheet Round 2) and calculate net revenue (profit). Employers with a more highly skilled workforce will experience more profits. Some employers might experience profits and others losses depending on the distribution of high- and low-productivity workers. Ask employers and employees if the signals were helpful in their hiring decisions. Employers will likely pay higher wages to their employees in round two and are more likely to earn profits. Employees are likely to earn higher

wages in round two; however, as in round 1, some will likely be left unemployed. In this case, unemployment is due to low productivity.

10. Debrief the lesson. Tell the students the meaning of the codes DO (high school dropout), HS (high school diploma), AA (associate's degree), BA (bachelor's degree), and MA (master's degree). Ask the students why cards with higher levels of education have higher productivity numbers. Explain to students that workers with more education and training tend to be more productive workers because they have more job skills. A computer programmer, for example, with a college degree in computer science is likely more productive at writing new programs than a computer programmer with no formal education.
11. Ask students why some employees did not secure employment. Students should recognize that employers were looking for employees with higher productivity. Ask employees what factor might improve their chances of earning a higher wage. Display Figure A (Differences in Unemployment by Education), and ask students to reflect on the relationship between education and the unemployment rate. Explain that the red line represents the unemployment rate of those with a high school diploma, but no college. The blue line represents the unemployment rate of those with a bachelor's degree. Tell the students that lower levels of education are associated with higher unemployment rates and higher levels of education are associated with lower levels of unemployment.
12. Ask the students which employees were offered the highest wages in round two. Students should recognize that employers were willing to pay a higher wage to employees who were more productive. Data support this relationship between education and income, as levels of education increase, incomes (on average) increase. Display Figure B (Differences in Earnings by Education), and ask the students to reflect on the relationship between education and income. Ask the students if this information is helpful in their own decisions about pursuing post-secondary education.
13. Ask students why the wages offered in the second round were likely more varied (and higher) than the first. Suggest to the students that in the first round employers lacked information about workers so they paid all workers a low wage. In the second round, employers had better information so they paid workers a wage that better reflected their productivity, which spanned from $7 to $23. Workers with the lowest productivity were likely not offered jobs because the minimum wage was higher than the economic value of their labor. Ask the students to explain why education credentials are important to job seekers. Students should recognize that academic credentials improve the likelihood of gaining employment with wages that reflect worker productivity.
14. Ask the employers to summarize why they were more likely to hire employees with more education and why the signal provided by the education credential was important. These workers were more productive, which means they produced more goods and services with the same resources; because they produced more, and earned higher revenues for the firm, employers could pay them a higher wage. Employers, additionally, were competing for highly

productive employees; they were likely to offer them the highest wages or risk losing them to other employers.

Discussion

The lack of active, engaging lessons in the social studies classroom is a problem that necessitates a change in the teaching strategy used by teachers. This lesson introduces an active learning approach to teach students about the value of education credentials and the functioning of labor markets. Students are provided the opportunity to learn about labor markets by being active participants in a simulated competitive labor market.

Economist Michael Spence was awarded a Nobel Prize in economics for his research on job-market signaling, or the process that matches workers and employers. In labor markets, employers seek workers who are highly productive and seek information that indicates this productivity. In Spence's (1973) model, academic credentials provide information employers use in their estimation of productivity. Education credentials serve as a signal of underlying abilities, talents, and motivation. The lack of academic credentials acts as a signal to screen out workers without those attributes. More educated workers earn more because their education has signaled their high ability (Spence, 2002). Other mainstream economic models suggest that education enhances the human capital of individual workers, which means the skills acquired through education enhances the productivity of workers, and their value to employers (Krugman & Wells, 2006). In this human capital model, employers seek workers with education credentials because education has raised the productivity of these workers, making them more valuable to employers (Gruber, 2005). These workers earn more because education has increased their productivity (Kolesnikova, 2010). In both cases employers are more likely to hire college-educated workers than non-college-educated workers because it is widely assumed that those with a college degree have developed the skills and knowledge required by the college or university to justify the granting of the degree. A student with a degree in engineering, for example, has successfully completed courses and projects the university judges as necessary to be an effective engineer. Obtaining a college degree requires the ability to set goals, to work efficiently, and to meet deadlines. These are characteristics and skills that transfer well to the job market and are very important to employers. Employers in turn are willing to pay higher wages for these skills.

Limitations and Considerations

The job market signaling activity described in this lesson is a simplified version of reality. First, it is well established that in the long-run productivity is the largest determinant of wages, on average; however, within the average there are large disparities. This simulation might be followed by a discussion of income inequality and the role of discrimination in the labor market. Second, the simulation describes the functioning of labor markets that are competitive: many buyers (employers) and sellers (prospective workers). In reality, there is much variation to the degree of competitiveness in various individual labor markets (Borjas, 2013). Labor markets with less competition will likely result in less efficient (and less favorable) outcomes for market participants (McConnell, Brue, & Flynn, 2012). Small incentives, further, were suggested for students acting as market participants, but in reality the incentives to find employment are much larger than can be created in a classroom simulation. As such, students might be influenced by the social context of the classroom more readily than they would be in

the labor market. Students should be encouraged to act out of their economic self-interest (not the social context of the classroom) as is the case in the labor market.

Conclusions

Active learning allows teachers to introduce concepts and content in an engaging format. This lesson seeks to teach important economic content while engaging students in an active labor market, specifically, job market signaling. Job market signaling is important for students to understand because it communicates the importance of academic credentials in the labor force. In this lesson, students discover the relationship between education and productivity, productivity and success in the labor market, and productivity and income. While employers cannot see productivity, they use academic credentials as a signal of productivity. In addition to teaching basic, essential economic content, this adds a useful level of understanding for high school students who are considering post-secondary education.

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Appendix A
Round 1 Cards

Cut and separate, then place one card in a security envelope and seal.

1 I can produce 1 widget per hour, which is valued at $5 each. I generate $5 of revenue for my employer.	1 I can produce 1 widget per hour, which is valued at $5 each. I generate $5 of revenue for my employer.	2 I can produce 2 widget per hour, which are valued at $5 each. I generate $10 of revenue for my employer.	2 I can produce 2 widget per hour, which are valued at $5 each. I generate $10 of revenue for my employer.
2 I can produce 2 widget per hour, which are valued at $5 each. I generate $10 of revenue for my employer.	2 I can produce 2 widget per hour, which are valued at $5 each. I generate $10 of revenue for my employer.	4 I can produce 4 widget per hour, which are valued at $5 each. I generate $20 of revenue for my employer.	4 I can produce 4 widget per hour, which are valued at $5 each. I generate $20 of revenue for my employer.
5 I can produce 5 widget per hour, which are valued at $5 each. I generate $25 of revenue for my employer.	5 I can produce 5 widget per hour, which are valued at $5 each. I generate $25 of revenue for my employer.	6 I can produce 6 widget per hour, which are valued at $5 each. I generate $30 of revenue for my employer.	6 I can produce 6 widget per hour, which are valued at $5 each. I generate $30 of revenue for my employer.

Appendix B

Employer Worksheet Round 1

Employee Rating Round 1: Number	Extra units produced X price per unit = Revenue Earned	Wage Paid	Net Revenue (profit)
	_____ x $5 = _____		
	_____ x $5 = _____		
	_____ x $5 = _____		
	_____ x $5 = _____		
	_____ x $5 = _____		
	_____ x $5 = _____		
	_____ x $5 = _____		
	_____ x $5 = _____		
Totals	Total Revenue = _____	**$_____**	$_____

Appendix C
Round 2 Cards

DO I can produce 1 widget per hour, which are valued at $5 each. I generate $5 of revenue for my employer.	**DO** I can produce 1 widget per hour, which are valued at $5 each. I generate $5 of revenue for my employer.	**HS** I can produce 2 widget per hour, which are valued at $5 each. I generate $10 of revenue for my employer.	**HS** I can produce 2 widget per hour, which are valued at $5 each. I generate $10 of revenue for my employer.
HS I can produce 2 widget per hour, which are valued at $5 each. I generate $10 of revenue for my employer.	**HS** I can produce 2 widget per hour, which are valued at $5 each. I generate $10 of revenue for my employer.	**AA** I can produce 4 widget per hour, which are valued at $5 each. I generate $20 of revenue for my employer.	**AA** I can produce 4 widget per hour, which are valued at $5 each. I generate $20 of revenue for my employer.
BA I can produce 5 widget per hour, which are valued at $5 each. I generate $25 of revenue for my employer.	**BA** I can produce 5 widget per hour, which are valued at $5 each. I generate $25 of revenue for my employer.	**MA** I can produce 6 widget per hour, which are valued at $5 each. I generate $30 of revenue for my employer.	**MA** I can produce 6 widget per hour, which are valued at $5 each. I generate $30 of revenue for my employer.

Appendix D
Employee Productivity

Productivity Round one = numbers Round two = letters	Extra units produced	Price per unit	Revenue Earned
1 = DO	1	5	$5
2 = HS	2	5	$10
4 = AA	4	5	$20
5 = BA	5	5	$25
6 = MA	6	5	$30

Appendix E
Employer Worksheet Round 2

Employee Rating Round 2: Two-letters	Extra units produced X price per unit = Revenue Earned	Wage Paid	Net Revenue (profit)
	_____ x $5 = _____		
	_____ x $5 = _____		
	_____ x $5 = _____		
	_____ x $5 = _____		
	_____ x $5 = _____		
	_____ x $5 = _____		
	_____ x $5 = _____		
	_____ x $5 = _____		
Totals	Total Revenue = _____	**$_____**	$_____

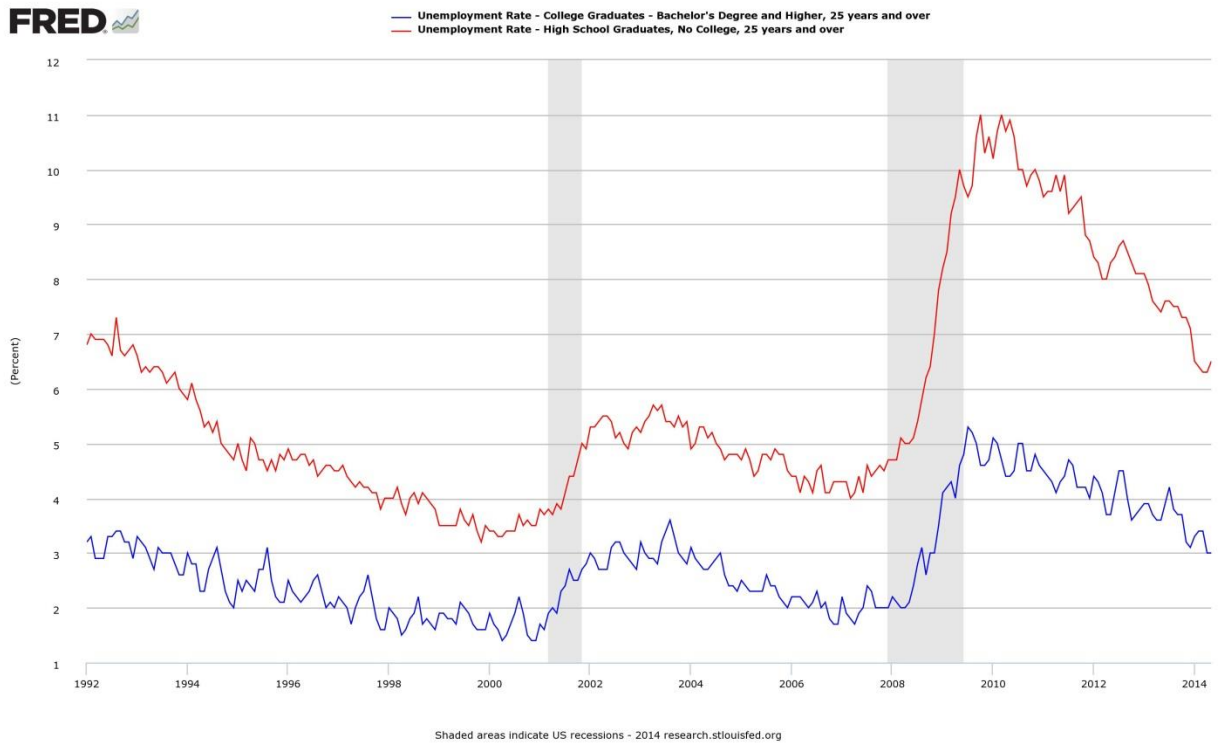

Figure A Differences in Unemployment by Education
Source: Federal Reserve Bank of St. Louis Federal Reserve Economic Data (FRED)

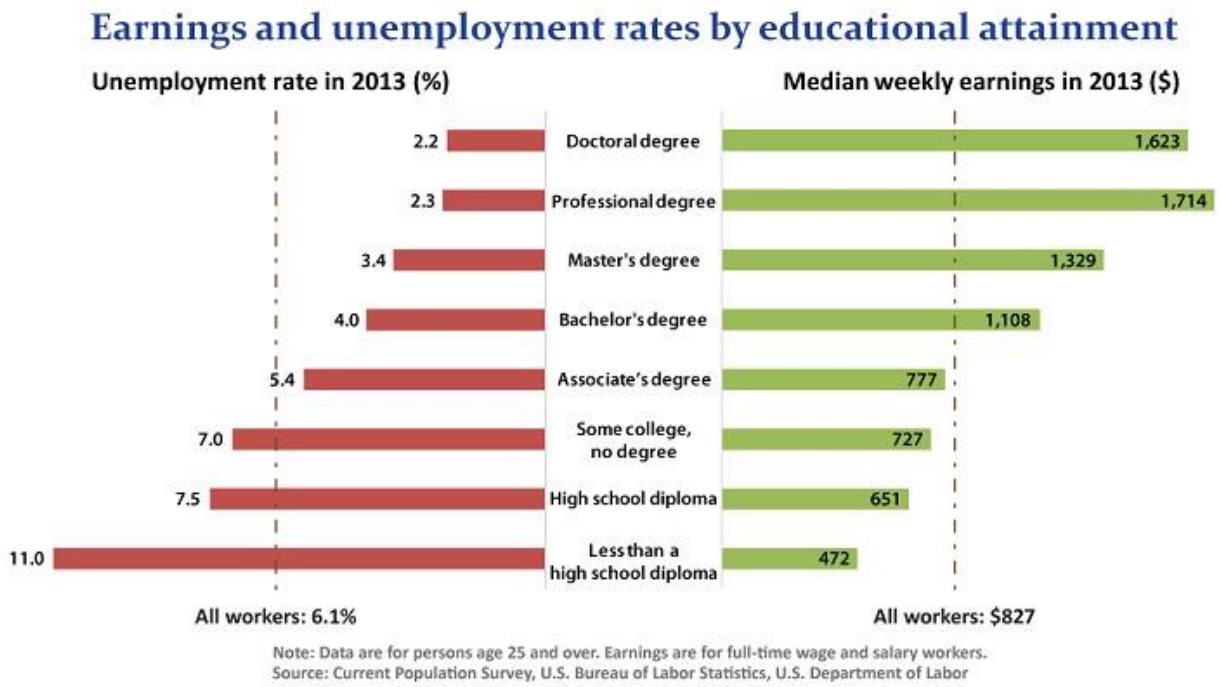

Figure B Differences in Earnings by Education
SOURCE: Bureau of Labor Statistics

Author's Bio

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