# OVEREDUCATION IN THE U.S. DURING THE GREAT RECESSION

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**Abstract**

I use the method introduced by Gottschalk and Hansen (2003) to analyze the rate of overeducation among workers with exactly a college degree between 2006 and 2013. To my knowledge, this is the first study to use this method to analyze trends in overeducation during the great recession in the U.S. I find that the proportion of workers with exactly a college degree working in occupations offering low college premiums increased during great recession and fell afterwards. An increase in the rate in overeducation could be due to more college-educated workers working in noncollege occupations that were noncollege in the past or because there was an increase in the number of noncollege occupations. I show that changes in the rate of overeducation are mostly due mostly to the latter. When shutting the down the flexibility for occupations to change from college to noncollege (and vice versa), the rate of overeducation increases only slightly between 2006 and 2013. Regardless, these findings run contrary to the secular decline of the rate of overeducation during the end of 20th century documented by previous research.

Keywords: Overeducation, College, Premium, Recession

JEL Classification: J24, I26

## I. Background and Summary

Traditionally, a worker is said to be overeducated (or underemployed) when he or she has more education than what is required for his or her job. Knowing the prevalence of overeducation is important for policy because overeducation may represent misallocated resources in an economy (McGuinness, 2008). Such inefficiency could arise due to job search and labor market frictions (Leuven and Oosterbeek, 2011). Under these scenarios, overeducated workers may not as easily recoup the cost of their educational investments if their surplus educational investments do not bring commensurate productivity and wage gains. There are numerous methods that have been employed to determine whether a worker is overeducated (Duncan and Hoffman, 1981; Rumberger, 1987; Verdugo and Verdugo, 1989; Kiker et al., 1997). The general finding from these studies is that overeducated workers usually earn more than workers in the same job who are not overeducated. Also, overeducated workers earn less than similarly educated workers who work in jobs that require higher levels of education.

Three popular approaches have been used to measure the rate of overeducation in a country. The first approach relies on surveys that asked respondents what level of education was required for their jobs, and an individual is determined to be overeducated if he or she reports having more education than what they say is required for his or her job (Duncan and Hoffman, 1981; Hartog and Oosterbeek, 1988; Hartog, 1986; Sicherman, 1991; Alba-Ramirez, 1993). This worker self-assessment method, while insightful, is subject to biases. For example, workers may easily overstate the level of education actually required or they may simply mirror requirements as stated by their employer than what is actually required for a job (Hartog, 2000). A second approach has relied on the work of professional job analysts, instead of survey respondents, to determine the required level of education is for specific occupations (Rumberger, 1987; Kiker and Santos, 1991). However, the reliability of professional job analysts, especially over long time-frames, has been called into question (Verdugo and Verdugo, 1992). The third approach relies on statistical methods to determine whether a worker is overeducated. In these methods, workers who have above the mode or mean plus one standard deviation of the

educational level in their occupation are determined to be overeducated. While these methods may be more agnostic than using the worker self-assessment or professional job analyst methods, they are not rooted in economic theory and are problematic if distributional changes in education levels in an occupation are not reflective of the changing educational requirements of that occupation.

An alternative approach proposed by Gottschalk and Hansen (2003) relies on classifying occupations by the earnings premiums they offer to college graduates. An occupation is said to be noncollege if it offers a college earnings premium below an arbitrarily low threshold to college-educated workers. Then the rate of overeducation among college-educated workers is the proportion of those who are employed in noncollege occupations. Rather than focus on the prevalence of excess skills among workers, this approach focuses on the prevalence of workers who on average are not able to easily recoup the cost of their educational investments through college earnings premiums. Consistent with skill-biased technological change (SBTC), he finds that there was a secular decline in the rate of overeducation between 1983 and 1994. Cardoso (2007) finds a similar trend using this method in Portugal from 1986-1999.

In this paper, I use the method of Gottschalk and Hansen (2003) to analyze overeducation in 2006-2013. To my knowledge, this study is the first that provides calculations of the rate of overeducation using this method during the great recession in the U.S.[1] I use the American Community Survey (ACS) for my analysis. One clear benefit of the ACS is the sheer number of observations available in every year. Because of this, I am able to more narrowly define occupations than Gottschalk and Hansen (2003).

The trend in what one should expect in overeducation during the great recession may not be immediately obvious. On one hand, people could be competing for a dwindling number of jobs leading some to unemployment and others to secure employment in jobs where they are overeducated

[1] O'Leary and Sloane (2014) use the same method to study overeducation during the great recession in the UK and find similar results to this paper. Fogg and Harrington (2011) use the American Community Survey to analyze overeducation during the great recession using a mixture of the job analyst and statistical approaches and find an increase in the rate of overeducation.

(Modestino et al., 2015). On the other hand, there has been evidence of rapid SBTC in some occupations during recessions in the past 25 years including the great recession (Hershbein and Kahn, 2016). Such rapid SBTC might have propped up college premiums for some occupations during the great recession.

I find that the rate of overeducation increased during the great recession and fell afterwards when designating workers earning less than 25% of the aggregate college premium as being overeducated. A key feature of this method is that an increase in the rate of overeducation could be due to an increase in the number of college-educated workers employed in noncollege occupations that were noncollege in the past or an increase in the number of noncollege occupations themselves (or both). When decomposing shifts in the rate of overeducation into these two types of shifts, I show that much of the year-to-year changes in the rate of overeducation are due to mostly to changes in the number of occupations being reclassified as noncollege. When holding the classification of occupations constant, I find that there is only a slight increase in the rate of overeducation in my time period. These results run contrary to the secular decline in the rate of overeducation in the late 20$^{th}$ century found by Gottschalk and Hansen (2003) and Cardoso (2007). However, they are concordant with findings of O'Leary and Sloane (2014) who use the same method to study overeducation during the great recession in the UK.

## II. Data

I use the American Community Survey (ACS) to estimate the rate of overeducation in the United States. I use the 2005-2014 ACS samples to estimate the aggregate college premium and within-occupation college premiums in every year from 2006 to 2013. Thus my time frame will cover the period before, during, and after the great recession in the United States. Though the ACS started in 2000, it was not fully implemented until 2005. I choose to exclude the ACS samples from 2000-2004 because of substantially smaller number of survey participants in these samples compared to the

number of survey participants in the 2005-2014 samples.[2] Having a large number of observations in every survey year is important for me to precisely estimate within-occupation college premiums for a large number of narrowly defined occupations. I use the Integrated Public Use Microdata Series (IPUMS) occupation classification which provides a time-invariant occupation classification system for all ACS survey years. The IPUMS occupations are more narrowly defined than the 3-digit Standard Occupational Classification (SOC) system used by Gottschalk and Hansen (2003) and can easily be aggregated to the 3-digit 2010 SOC system.[3]

I use a comparable sample to the one used by Gottschalk and Hansen (2003). My sample includes nonstudent male and female workers with at least a high school degree and 10 years or less of (potential) labor market experience.[4] This experience restriction is imposed track the rate of overeducation among recent college graduates. I focus on the premium paid to those with exactly a college degree (college workers) over those with at least a high school degree, but no college degree (noncollege workers).[5] Both part-time and part-year workers are included in the sample.[6] I exclude workers who reported working zero weeks in the past 12 months, workers who reported working more than 98 hours per week, self-employed workers, and unpaid family workers.

My earnings measure is the log real average weekly wage in 2013 dollars.[7] Reported yearly wage incomes that fall in the 99.5$^{th}$ percentile in every state each year are topcoded. I multiply any topcoded wage incomes by 1.45 following Katz and Murphy (1992). Starting in 2008, weeks worked was reported in brackets. I impute weeks worked in the 2008-2014 samples as the average of weeks worked in each bracket by sex in 2005-2007.[8]

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[2] The number of observations in each ACS sample from 2000-2004 is less than 1.2 million while the number of observations in each ACS sample from 2005-2014 is greater than 3 million.
[3] In particular, I use the variable named occ2010. For more information, please refer to IPUMS-USA: https://usa.ipums.org.
[4] Potential labor market experience=min(age-yrsschool-7,age-17).
[5] By this definition, I estimate the college premium using workers who may have earned associate's degrees or entered and attended college, but never earned college degrees.
[6] I control for full-time status when estimating premiums.
[7] I use the chain-weighted Personal Consumption Expenditures deflator (PCE).
[8] This approach is also used in Katz and Murphy (1992).

The means and standard deviations of variables I use to estimate the college premium on the sample I have constructed are presented in Table 1. Overall, there has been little change between years. There appears to be a slight decrease in real wages and the percentage of full-time workers starting in 2008. Between 2006 and 2013 there has been a very slight increase in the proportion of workers with a college degree between and a slight decrease in the percentage of full-time workers. Although small, most of the differences in means between any two adjacent years of the variables listed in Table 1 are statistically significant at the 95% level.[9]

I estimate the college premium for my sample using the following specification in every year:

$$Y = \beta_0 + \beta_1 College + \beta_2 Female + \beta_3 Black + \beta_4 Hisp + \beta_5 Fulltime + \beta_6 Exp + \beta_7 Exp^2 + \varepsilon \quad (1),$$

where Y is the natural log of real average weekly earnings (in 2013 dollars). I regress this variable on indicators for whether an individual has college degree, is female, is black, is Hispanic (non-black), is a full-time worker, and on a quadratic of potential work experience. The college premium in a given year is determined by the estimate of $\beta_1$. Estimates and 95% confidence intervals of the college premium are depicted in Figure 1. The figure shows the college premium reaching exceeding .51 in 2005-2007, declining to .49 in 2008, and stagnating after 2009. My findings are concordant with findings from the literature. Namely, Gottschalk and Hansen (2003) find a premium of roughly .45 in 1995 and James (2012) shows that, the college premium for workers with only a bachelor's degree (no advanced degree) has stagnated between 2000 and 2010.

## III. Methods

### a. Using Premiums in Every Year to Measure the Rate of Overeducation

I follow the methodology of Gottschalk and Hansen (2003) to define whether an occupation is a noncollege or college occupation based on the magnitude of the college premium estimated for that occupation. A college degree is one that pays college-educated workers a substantial premium while

[9] Results of this exercise are available on request.

a noncollege degree is one that does not. The threshold for determining whether a college premium is substantial is arbitrary. Gottschalk and Hansen (2003) define a noncollege occupation to be one that pays below a .1 college premium. In this paper, I consider multiple thresholds.

Estimating a college premium for workers with exactly a college degree may not make sense for certain occupations (lawyers, e.g.). Following Gottschalk and Hansen (2003), I first determine the occupations that fall into this category by calculating the percent of workers in every occupation with at least a college degree. For this step, I include workers with at least a high school degree, workers with exactly a college degree, and also workers with an advanced degree. Any occupation that has an average of more than 90% workers with a college degree or higher is determined to be a college occupation.[10] These occupations include physicians, pharmacists, dentists, veterinarians, psychologists, aerospace engineers, chemists, special education teachers, lawyers.

For the remaining occupations, I estimate the college premium paid to college workers with exactly a college degree. In any year, I pool workers of any particular occupation with workers in that occupation from the previous year and one year ahead to avoid college premiums from fluctuating greatly between years but also to allow premiums to change over time. Thus an estimate for a within-occupation college premium from 2007 would include workers in that occupation from 2006 and 2008. I regress log real average weekly wage by year and occupation with dummy variables for females, full-time workers, whether the observation was from the previous year, whether the observation was from the year ahead, and a quadratic in potential experience.

Some occupations using the IPUMS classification system are much smaller by employment (and observations) than others. In order to generate precise estimates, I require each occupation for which I estimate a premium to have at least 50 college and 50 noncollege workers in every year.[11] If an occupation does not meet this requirement in at least one year between 2006 and 2013, I aggregate

[10] I take the average percentage of workers with at least a college degree in an occupation across the 2005-2014 ACS samples.

[11] That is, 50 college workers and 50 noncollege workers after pooling observations from the year before and the year after in every year from 2006 to 2013.

this occupation with similarly problematic occupations to the 3-digit 2010 SOC level. Doing so allows me to retain and estimate premiums for the narrowly defined occupations using the IPUMS classification system. Many occupations that were aggregated to the 3-digit 2010 SOC level still did not have 50 college and 50 noncollege workers observed in every year between 2006 and 2013. I aggregate these to the 2-digit 2010 SOC level. Any occupations aggregated to the 2-digit 2010 SOC level that still did not meet my observation count requirement, were all pooled together into a miscellaneous category. The observations in this miscellaneous category represent 1.1% of the entire sample. This aggregation procedure provides me with 276 distinct occupations. Of these, 49 are occupations that I define to be college ones based on employment (i.e., occupations that are made up of greater than 90% college graduates). The remaining 227 occupations are ones for which I will estimate the college premium in in every year in 2006-2013.

I calculate the rate of overeducation among workers with only a bachelor's degree in each year in 2006-2013 by taking the number of these workers in occupations paying a low premium over the total number of workers in that year. Gottschalk and Hansen (2003) consider occupations that pay a premium of less than .1 in log real weekly earnings to be noncollege occupations. Occupations that pay a premium of less than .1 in 2006 include food processing workers, motor vehicle operators, massage therapists, postal service mail carriers, painters, and construction and maintenance workers. I also consider premium thresholds of .15, .2, and .25 for determining whether an occupation is noncollege. The rate of overeducation in 2006-2013 using these four thresholds are depicted in Figure 2.

The rate of overeducation using a .1 premium threshold in 2006 is quite small but harmonious with previous findings.[12] When increasing the cutoff for defining an occupation as noncollege, the proportion of overeducated workers increases mechanically. The findings from the .1, .15, thresholds

[12] Gottschalk and Hansen (2003) finds a decline in the proportion of overeducated workers from roughly .09 to .03 between 1983 and 1994. Because the aggregate college premium among workers with only a bachelor's degree still increased after 1994, the rate of overeducation using a threshold of .1 in my time period may not be appropriately comparable and would likely understate the rate of overeducation compared to his findings.

are similar: there is an increase in the proportion of overeducated workers during the great recession peaking in 2009, and declining after. This is different to the findings of Gottschalk and Hansen (2003) who find a secular decrease in the proportion of overeducated college workers between 1983 and 1994. When setting the threshold to .2, the rate of overeducation is shown to decrease over time, while a setting a threshold of .25 indicates a slight increase.[13] The components of these changes and the disparate results from the .2 and .25 thresholds will be explored and reconciled in the following subsection.

### b. Between and Within Components of Changes in the Rate of Overeducation

As illustrated in Figure 1, there was a statistically significant decline in the aggregate college premium between 2007 and 2008. It could be that using a fixed threshold may detect an increase in the rate of overeducation because all occupations suffered a decline in the college premium. If this is the case, the number of occupations classified as being noncollege may be greater in 2009 than in 2006. A close examination of occupations and their yearly premiums shows that the number of noncollege occupations increased between 2006 and 2009. There were 8 noncollege occupations in 2006 and 13 noncollege occupations in 2009 when using a premium threshold of .1.

While many occupations changed from college to noncollege between these years, there were others that did the reverse. Following the aggregate trend in the college premium, there were 12 occupations that paid a premium of greater than .1 in 2006 but less than .1 in 2009.[14] However, there were also 7 occupations that did the opposite, paying a premium of less than .1 in 2006 but greater

[13] These findings are similar when also considering unemployment to be an occupation that pays no premium to workers with a college degree.

[14] The following are these occupations: life, physical, and social science occupations; surveying and mapping technicians; respiratory therapists; physical therapist assistants and aides; dental assistants; combined food preparation and serving workers, including fast food; food preparation and serving related workers (not elsewhere classified); maids and housekeeping cleaners; construction laborers; telecommunications line installers and repairers; hand packers and packagers.

than .1 in 2009.[15] Thus, the results presented in Figure 2 depends on the number of noncollege occupations in each year and the proportion of college workers working in those occupations.

Gottschalk and Hansen (2003) justify the flexibility for an occupation to offer a different premium in every year and possibly change from noncollege to college over time because of SBTC. This line of reasoning may be appropriate for the length of time period in their study (1983-1994). However, the growth in noncollege occupations I have documented between 2006 and 2009 may not be due to a reverse of SBTC. In fact, Hershbein and Kahn (2016) present evidence that SBTC was actually exacerbated during the financial crisis. I thus explore how much the results in Figure 2 are driven by occupations fluctuating between being college or noncollege vs. the changes in the size of noncollege occupations by employment size.[16]

In Figure 3, I show that changes in the rate of overeducation are largely due to the yearly reclassification of occupations as being college or noncollege. Figure 3A plots the change in the share of overeducated workers using .1 as the premium threshold. These are the year-to-year changes in the rate of overeducation of the line in Figure 2A. The change in the share of overeducated workers between two adjacent years is due to what I define as changes of within and between shares, which I define below.

Let $O$ be the set of all occupations. In year $t$, let the set of college occupations be $O_{t,C}$ and the set of noncollege occupations be $O_{t,N}$, and the share of employment in an occupation be $\gamma_i$. The rate of overeducation in a given year is defined as:

$$OE_t \equiv \frac{\sum_i \gamma_{t,i} O_{t,N}}{\sum_i \gamma_{t,i} O_t} \quad (2).$$

[15] The following are these occupations: food processing workers; purchasing agents, except wholesale retail, and farm products; agricultural and food science technicians; healthcare practitioners and technical occupations (not elsewhere classified); massage therapists; food preparation workers; bookbinders, printing machine operators, and job printers.

[16] To address this issue, Gottshalk and Hansen (2013) calculate the probability that each occupation pays a premium lower than .1. College workers are then assigned these probabilities. The aggregate probability that a worker with exactly a college degree receives a premium of less than .1 in a year is simply the (weighted) average of these probabilities. Findings from this exercise are similar to the ones from Figure 2 and are presented in Appendix A.

For two years $t = 0$ and $t = 1$, some occupations that are noncollege in year $0$ are also noncollege in year $1$. Let the set of these shared noncollege occupations be $O_{0,N_s}$ and the remaining noncollege occupations unique to year $0$ be $O_{0,N_u}$. Thus $O_{0,N} = O_{0,N_s} \cup O_{0,N_u}$, and $O_{0,N_s} \cap O_{0,N_u} = \emptyset$. Also, let the set of noncollege occupations in year $1$ that were college in year $0$ be $O_{1,N_u}$. Similarly, $O_{1,N} = O_{1,N_s} \cup O_{1,N_u}$, and $O_{1,N_s} \cap O_{1,N_u} = \emptyset$. The rate of overeducation in either year can then be decomposed as:

$$OE_t = \frac{\sum_i \gamma_{t,i} O_{t,N_S}}{\sum_i \gamma_{t,i} O_t} + \frac{\sum_i \gamma_{t,i} O_{t,N_u}}{\sum_i \gamma_{t,i} O_t} = (Within\ Share)_t + (Between\ Share)_t \quad (3)$$

The change in the rate of overeducation between years $1$ and $2$ can then be calculated as the change in these components:

$$\Delta OE_{0,1} = OE_1 - OE_0 =$$

$$[(Within\ Share)_1 - (Within\ Share)_0] + [(Between\ Share)_1 - (Between\ Share)_0] =$$

$$\Delta(Within\ Share) + \Delta(Between\ Share) \quad (3).$$

Thus the change in the within share is the portion of the change in the rate of overeducation due to employment changes in noncollege occupations that are defined as noncollege in both years. The between change represents the change in the number of overeducated workers as a result of occupations being classified as noncollege in the first year and college in the next and vice versa. Figure 3B plots within and between changes, and clearly demonstrates that much of the change in the share of overeducated workers is due to between changes.[17]

The changes documented in Figure 2 may be from labor market shocks to within-occupation college premiums during the great recession. Because the nature and function of many occupations are likely similar between 2006 and 2013, I use premiums calculated for 2006 only (using data from 2005-2007) to determine whether an occupation is college or noncollege for the entire period.[18] This

[17] For each year, I use the preceding year as year $0$.

[18] I also consider estimating within-occupation premiums by pooling across all years, and the findings do not differ substantially from using within-occupations from 2006 only.

method shuts down between changes and will only highlight employment changes in noncollege occupations as defined by the premiums calculated for 2006. I present findings using this method in Figure 4. Relative to the rates illustrated in Figure 2, there has been substantially less movement in the rate of overeducation when shutting down between changes. Depending on the threshold considered, the rate of overeducation has either remained stable or increased slightly between 2006-2013.

**IV. Conclusion**

In this paper, I have studied overeducation in the U.S. between 2006 and 2013. This time-frame is particularly interesting because it covers the period before, during, and after the great recession. I employ a methodology introduced by Gottschalk and Hansen (2003) that is less commonly utilized in the literature. When replicating their method, I find that among workers with exactly a college degree, the proportion of workers with exactly a college degree working in occupations that paid very low college premiums increased during the great recession and decreased after. Changes in the rate of overeducation could be due to an increase in the number of college-educated workers employed in noncollege occupations that were noncollege in the past or could be due to an increase in the number of noncollege occupations themselves. I decompose shifts in the rate of overeducation to changes of within shares and between shares to show that much of the movement documented is due to changes in the between shares. When I keep the classification of an occupation as college or noncollege constant over time, the rate of overeducation only exhibits a slight increase in this time period. Either way, these findings run contrary to findings from previous research that show a general decrease in the rate of overeducation during the late 20$^{th}$ century. They are, however, concordant with findings from O'Leary and Sloane (2014) who use the same methodology to document an increase in the rate of overeducation in the U.K. during the great recession.

The findings of this paper, while puzzling, may not be problematic. There has been some evidence of SBTC occurring rapidly in some occupations during recessions in the past 25 years, even during

the great recession (Hershbein and Kahn, 2016). Thus one might expect within-occupation premiums for college-educated workers to rise on average during the recession. However, I show that within-occupation premiums fell on average, and for some occupations so much that they would be classified as a noncollege occupation. It could be that SBTC was not pervasive enough to increase within-occupation premiums overall. Also, my narrowly defined occupations may still be broad enough to contain jobs requiring skilled and unskilled tasks, and the share of employment in jobs requiring unskilled tasks increased in this period. My main suspicion, however, is that wage premiums estimated during the recession may simply not be well correlated with the actual productivity of college-educated workers. A suggestion for future research would be to obtain better measures of worker productivity during the great recession.

## References


Alba-Ramirez, Alfonso. "Mismatch in the Spanish labor market: overeducation?." *Journal of Human Resources* (1993): 259-278.

Cardoso, Ana Rute. "Jobs for young university graduates." *Economics Letters* 94, no. 2 (2007): 271-277.

Duncan, Greg J., and Saul D. Hoffman. "The incidence and wage effects of overeducation." *Economics of Education Review* 1, no. 1 (1981): 75-86.

Gottschalk, Peter, and Michael Hansen. "Is the proportion of college workers in noncollege jobs increasing?." *Journal of Labor Economics* 21, no. 2 (2003): 449-471.

Hartog, Joop. "Allocation and the earnings function." *Empirical Economics*11, no. 2 (1986): 97-110.

Hartog, Joop, and Hessel Oosterbeek. "Education, allocation and earnings in the Netherlands: Overschooling?." *Economics of Education Review* 7, no. 2 (1988): 185-194.

Hartog, Joop. "Over-education and earnings: where are we, where should we go?." *Economics of Education Review* 19, no. 2 (2000): 131-147.

Hershbein, Brad, and Lisa B. Kahn. "Do Recessions Accelerate Routine-Biased Technological Change?." (2016).

James, Jonathan. "The College Wage Premium." *Federal Reserve Bank of Cleveland Economic Commentary* 2012-10 (2012): 2012-10.

Katz, L.F. and Murphy, K.M., 1991. *Changes in relative wages, 1963-1987: Supply and Demand Factors* (No. w3927). National Bureau of Economic Research.

Kiker, B. F., and Maria C. Santos. "Human capital and earnings in Portugal."*Economics of Education Review* 10, no. 3 (1991): 187-203.

Kiker, Billy Frazier, Maria C. Santos, and M. Mendes De Oliveira. "Overeducation and undereducation: Evidence for Portugal." *Economics of Education Review* 16, no. 2 (1997): 111-125.

Leuven, Edwin, and Hessel Oosterbeek. "Overeducation and mismatch in the labor market." *Handbook of the Economics of Education* 4 (2011): 283-326.

McGuinness, Seamus. "How biased are the estimated wage impacts of overeducation? A propensity score matching approach." *Applied Economics Letters* 15, no. 2 (2008): 145-149.

Modestino, Alicia Sasser, Daniel Shoag, and Joshua Ballance. *Upskilling: Do Employers Demand Greater Skill When Workers Are Plentiful?*. No. rwp15-013. 2015.

O'Leary, Nigel C., and Peter J. Sloane. "Too Many Graduates? An Application of the Gottschalk-Hansen Model to Young British Graduates between 2001-2010." (2014).

Steven Ruggles, Katie Genadek, Ronald Goeken, Josiah Grover, and Matthew Sobek. *Integrated Public Use Microdata Series: Version 6.0* [Machine-readable database]. Minneapolis: University of Minnesota, 2015.

Rumberger, Russell W. "The impact of surplus schooling on productivity and earnings." *Journal of Human Resources* (1987): 24-50.

Sicherman, Nachum. "" Overeducation" in the Labor Market." *Journal of Labor Economics* (1991): 101-122.

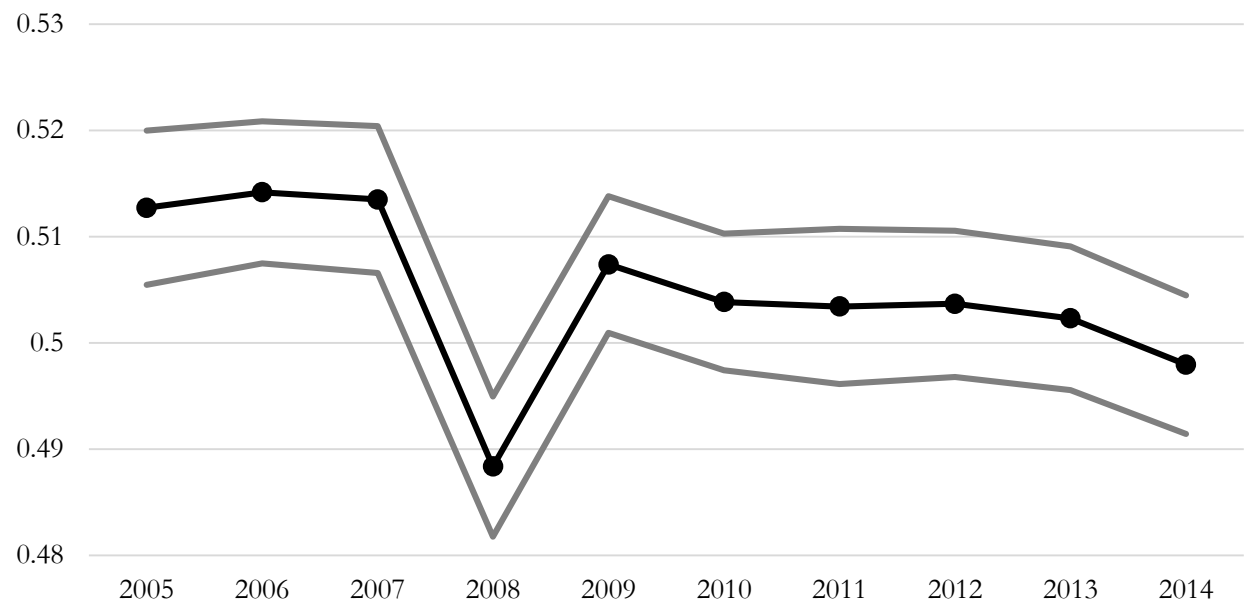
Verdugo, Richard R., and Naomi Turner Verdugo. "The impact of surplus schooling on earnings: Some additional findings." *Journal of Human Resources* (1989): 629-643.

**Table 1 - Descriptive Statistics**

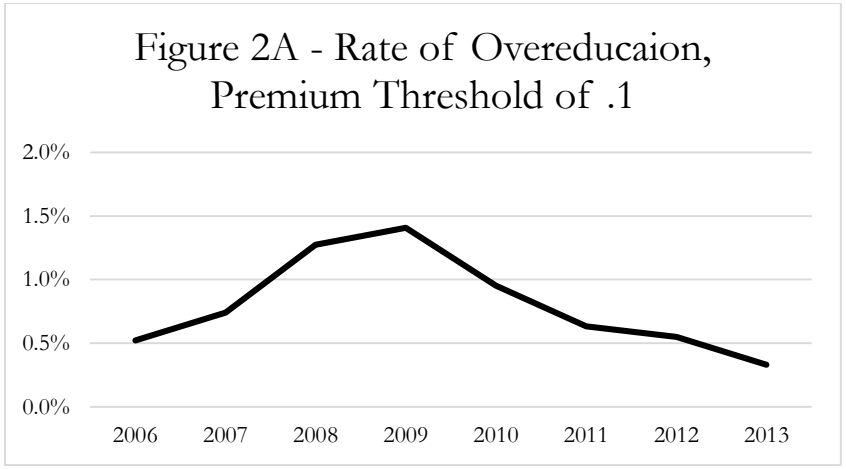
| Year | n | Log Real Avg Weekly Wage | % College | % Female | % Black | % Hisp. | Potential Exp. | % Full-time |
|---|---|---|---|---|---|---|---|---|
| 2005 | 172,148 | 6.42 | 0.33 | 0.46 | 0.09 | 0.13 | 5.15 | 0.87 |
| | | (0.65) | (0.47) | (0.5) | (0.28) | (0.33) | (3.15) | (0.34) |
| 2006 | 181,288 | 6.41 | 0.32 | 0.46 | 0.09 | 0.14 | 5.10 | 0.87 |
| | | (0.65) | (0.47) | (0.5) | (0.29) | (0.34) | (3.14) | (0.33) |
| 2007 | 182,773 | 6.43 | 0.33 | 0.46 | 0.09 | 0.14 | 5.07 | 0.87 |
| | | (0.65) | (0.47) | (0.5) | (0.29) | (0.35) | (3.14) | (0.33) |
| 2008 | 185,884 | 6.40 | 0.34 | 0.46 | 0.09 | 0.14 | 5.12 | 0.86 |
| | | (0.64) | (0.47) | (0.5) | (0.29) | (0.35) | (3.14) | (0.34) |
| 2009 | 182,898 | 6.37 | 0.35 | 0.47 | 0.09 | 0.14 | 5.18 | 0.84 |
| | | (0.64) | (0.48) | (0.5) | (0.28) | (0.35) | (3.12) | (0.37) |
| 2010 | 179,172 | 6.35 | 0.35 | 0.47 | 0.09 | 0.15 | 5.22 | 0.83 |
| | | (0.65) | (0.48) | (0.5) | (0.28) | (0.36) | (3.11) | (0.38) |
| 2011 | 175,491 | 6.32 | 0.35 | 0.46 | 0.09 | 0.15 | 5.18 | 0.82 |
| | | (0.65) | (0.48) | (0.5) | (0.29) | (0.36) | (3.13) | (0.38) |
| 2012 | 178,782 | 6.31 | 0.36 | 0.46 | 0.09 | 0.15 | 5.15 | 0.82 |
| | | (0.64) | (0.48) | (0.5) | (0.29) | (0.36) | (3.12) | (0.38) |
| 2013 | 186,689 | 6.31 | 0.37 | 0.46 | 0.09 | 0.15 | 5.16 | 0.83 |
| | | (0.65) | (0.48) | (0.5) | (0.29) | (0.36) | (3.12) | (0.38) |
| 2014 | 191,519 | 6.31 | 0.37 | 0.46 | 0.10 | 0.15 | 5.15 | 0.83 |
| | | (0.65) | (0.48) | (0.5) | (0.29) | (0.36) | (3.12) | (0.38) |

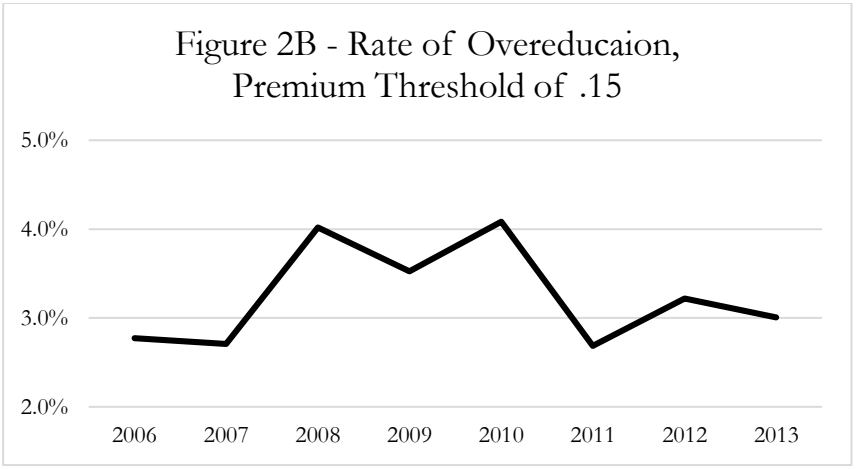
Note: Figures above are the unweighted variable means of the sample of workers described in section III for 2005-2014. Standard deviations for each variable are provided in parentheses.

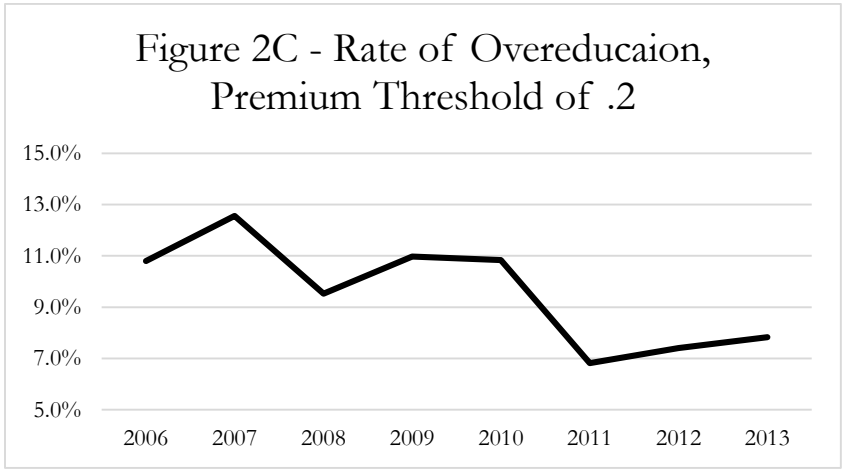
Figure 1
The College Premium, 2005-2014

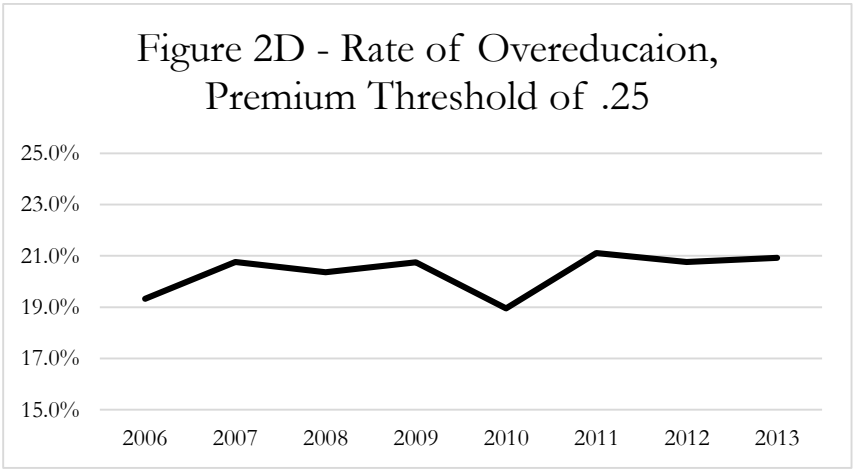



Note: This figure presents the estimates of the college premium in every year from 2005-2014 (black line) and 95% confidence intervals constructed using robust standard errors (grey lines). The college premium is calculated by estimated coefficient on having a college degree in a log real weekly earnings regressions estimated separately in each year from the American Community Survey. The sample used to estimate the premium is described in section III.

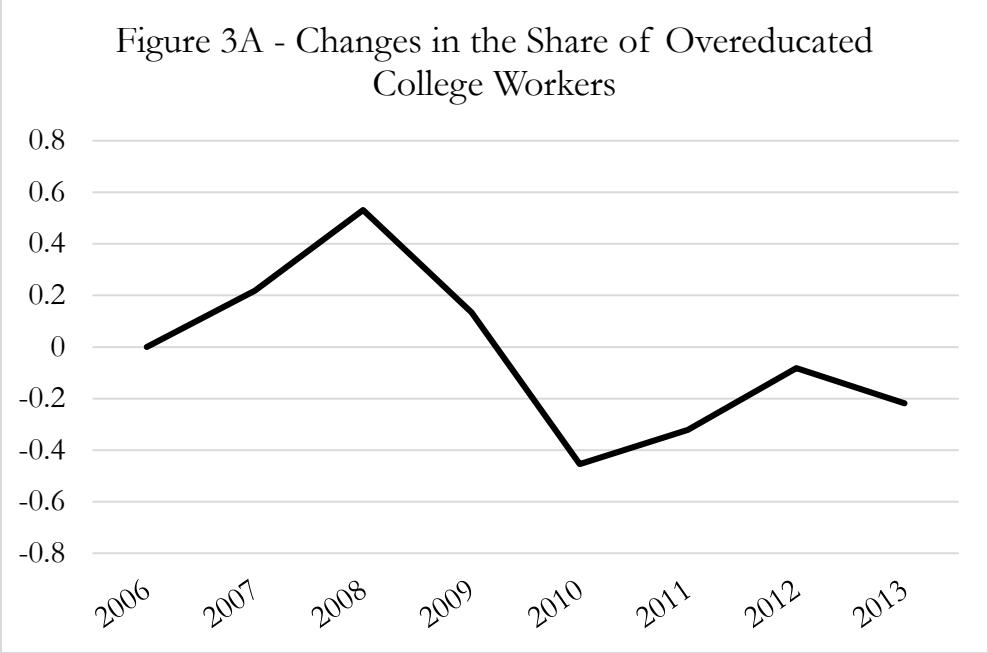


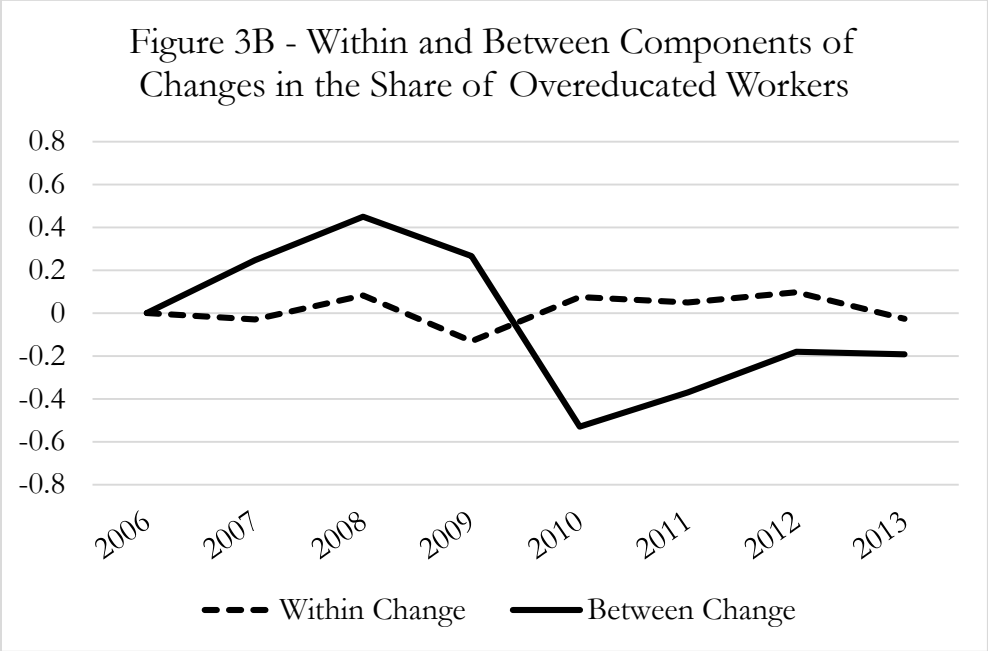



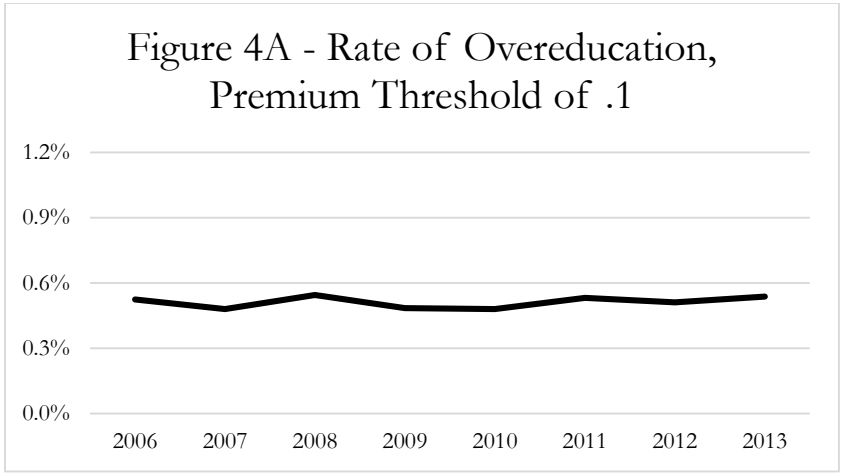



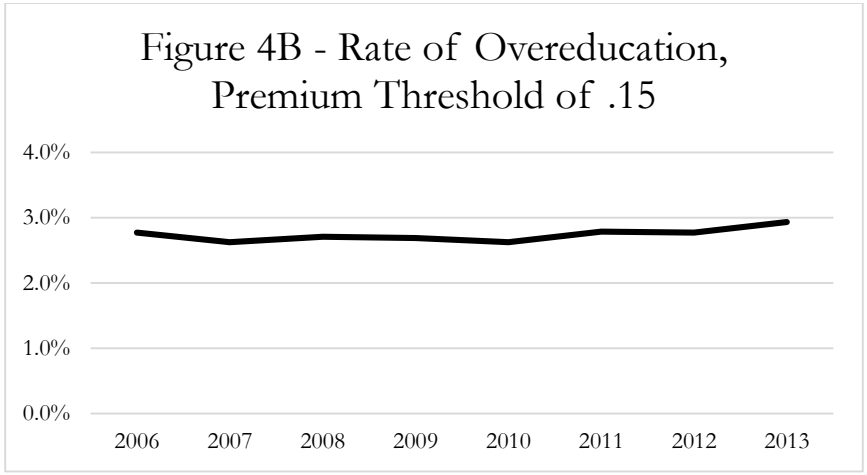

Note: This figure presents the rate of overeducation in 2006-2013 using different college premium thresholds to determine whether an occupation is college or noncollege. There will be more noncollege occupations as the threshold is raised and the rate of overeducation will be higher, mechanically. Figures 2A and 2B show an increase in the rate of overeducation during the financial crisis, while Figure 2C shows a decline. Finally, figure 2D shows a slight increase in the rate of overeducation over time.

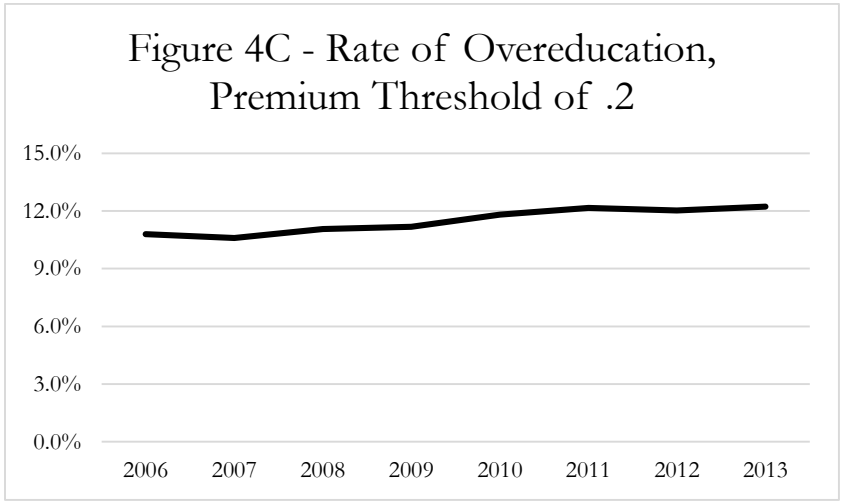


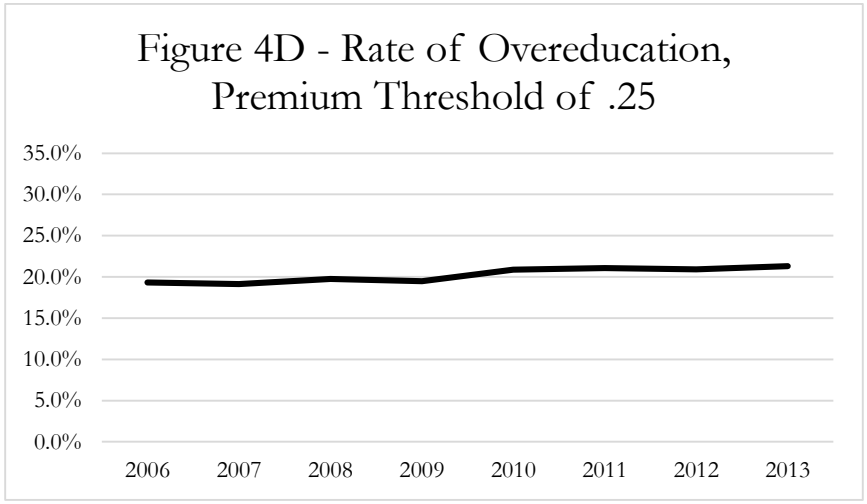




Note: Figure 3A presents the year-to-year changes in the rate of overeducation when using a college premium threshold of .1. That is, Figure 3A presents the year-to-year changes in the rate of overeducation shown in Figure 2A. Figure 3B shows how much of the change in the rate of overeducation is due to within share changes and between share changes. The within share change in a given year is any change in the rate of overeducation due to changes in employment in occupations that are noncollege in that year and the year before. The between share change is any change in the rate of overeducation that occurs due to occupations shifting from college to noncollege or vice versa.




Note: This figure presents the rate of overeducation in 2006-2013 using different college premium thresholds to determine whether an occupation is college or noncollege. In contrast to Figure 2, occupations are determined to be college or noncollege based on their 2006 premium only. In general, there has been only a slight increase in the rate of overeducation when using this approach.

**Appendix A**

The measure of overeducation I use to produce Figure 2 relies on classifying an occupation as either being a noncollege occupation or not. Thus the number of occupations classified as being noncollege could vary substantially from year to year simply due to noisy estimates of within-occupation premiums. Gottschalk and Hansen (2003) address this by calculating the probability an occupation pays less than a given threshold. Then an individual's probability of being in a noncollege job is taken to be the probability that his or her occupation pays a premium less than that given threshold. The aggregate probability of being in a noncollege occupation in a given year is simply the (weighted) average probability across individuals of being in a noncollege job. The outcomes of this exercise are presented below. The findings are similar to Figure 2. Namely, the trends from Figure A1, Figure A3, and Figure A4 match their Figure 2 counterparts. The only exception is Figure A2 which unlike Figure 2B, shows no big increase during the great recession.

Figure A1 - Probability of Overeducaion, Premium Threshold of .1

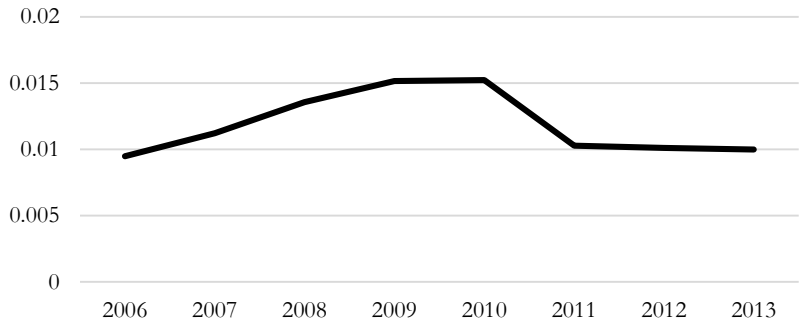



Figure A2 - Probability of Overeducaion, Premium Threshold of .15

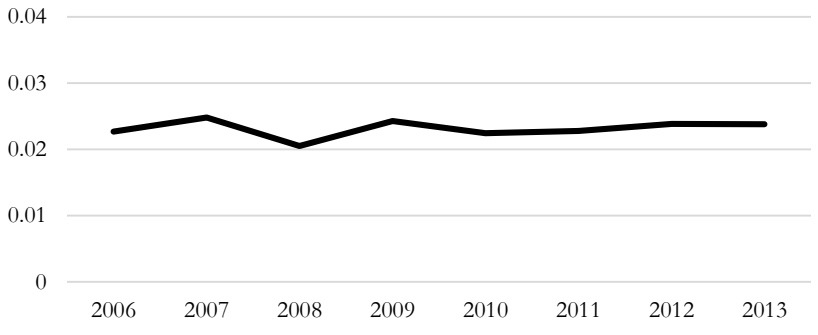



Figure A3 - Probability of Overeducaion, Premium Threshold of .2

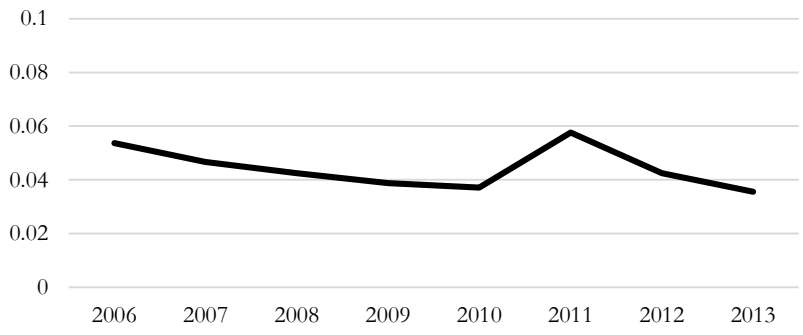



Figure A4 - Probability of Overeducaion, Premium Threshold of .25