

# Greater Equivalency of High School Equivalents? A Study of GEDs and Their Effect on Labor Market Status

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## Abstract

Using the National Longitudinal Survey of Youth (NLSY) data from 1978, Cameron and Heckman found that GED recipients are indistinguishable from high school dropouts in labor market status. I use more recent data from the 1999-2006, the Current Population Survey (CPS), to provide evidence that GED recipients do earn higher wages than high school dropouts and that GED attainment is associated with greater wage boosts for those who drop out before attending high school. Additional findings suggest that the GED plays little role in labor force participation and employment, but it may help increase one's chances of being in a higher-paying occupation. This suggests that in more recent years, the GED has offered greater benefits in the labor market.

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## I. Introduction

Forty-four years ago, every state had moved to acceptance of the General Education Development Tests as a high school graduation credential. The GED became an important element of the educational system and sparked debate of how attainment of this high school “equivalent” affects one’s labor market status.

Human capital has always been viewed as a vital component of the labor market. Ashenfelter and Rouse (1998) estimate that the average return to schooling is about 9 percent per year when obtained for a sample of genetically identical individuals and that the return to schooling is slightly lower for people with higher ability.<sup>2</sup> There still remains the disputed question of to what extent these returns are due to human capital acquisition and to what extent they are due to the signaling value of educational credentials. Jaeger and Page (1996) look at the signaling value of diplomas and find that there are significant effects on wages for high school diploma recipients among white males.<sup>3</sup> Whether GEDs serve as this signal or as a means to gain human capital, there still remains the question of how this credential translates in the labor market.

The GED exam began in the early 1940s during World War II. Many men enrolled in the army did not have high school diplomas because they had dropped out to join the military.<sup>4</sup> Without a diploma, these men could not enter college without special deals. As a result, in 1942, the Advisory Committee to the Army Institute chose five different tests from the Iowa Test of Educational Development to become the first General Educational Development Tests.<sup>5</sup> By 1963, all 50 states accepted the GED exam as a high school graduation credential. The GED is comprised of five different subject tests, including writing skills, social studies, science, reading skills, and mathematics. Each state sets its own passing standards.<sup>6</sup>

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<sup>2</sup>Ashenfelter, Orley, and Cecilia Rouse. “Income, Schooling, and Ability: Evidence From a New Sample of Identical Twins.” *The Quarterly Journal of Economics*, 113, 1998.

<sup>3</sup>Jaeger, David A., and Marianne E. Page. “Degrees Matter: New Evidence on Sheepskin Effects in the Returns to Education.” *The Review of Economics and Statistics*, 4, 1996.

<sup>4</sup>Boesel, David, Nabeel Alsalam, and Thomas Smith. “Research Synthesis: Educational and Labor Market Performance of GED Recipients.” *U.S. Department of Education*. 1998. <<http://www.ed.gov/PDFDocs/GED/gedfront.pdf>>.

<sup>5</sup>Ibid.

<sup>6</sup>Cameron, Stephen V., and James J. Heckman. “The Nonequivalence of High School Equivalents.” *Journal of Labor Economics*, 11, 1993.

Most people who take the GED Test are less than twenty-five years old.<sup>7</sup> In 1995, GED test takers had finished an average of 9.9 years of schooling. Passing rates for the exam have generally been between 70-80 percent.<sup>8</sup> GED recipients are observably different from non-recipient dropouts and those with a high school diploma. Relative to non-recipient dropouts, people with a GED have, on average, more years of schooling before dropping out of high school, higher levels of measured cognitive skill, higher family income, and higher levels of parental education.<sup>9</sup> Relative to high school graduates, GED recipients have, on average, 2.1 fewer years of schooling, or about 861 fewer hours of core curriculum classes.<sup>10</sup> Because GED recipients have considerably less class-time, on average, it is not clear that the GED truly is “equivalent” to a diploma.

I base this work on a prominent study by Cameron and Heckman (1993) that used National Longitudinal Survey of Youth (NLSY) data for males between the ages of 13-20 in 1978. Cameron and Heckman find that at age 25, the mean labor market status of high school dropouts is the same as the status of GED recipients.<sup>11</sup> Both of these groups are inferior to high school diploma recipients regarding hours worked, wages, salaries, weeks worked, and length of time at job. Cameron and Heckman then interact GED variables with years of completed schooling. They find that GED recipients and dropouts with the same years of schooling earn the same wages. However, high school graduates earn statistically significant higher wages only when compared to GED recipients or dropouts with 10 or fewer years of schooling. High school graduates compared to GED recipients or dropouts with 11 years of schooling are indistinguishable. This result could favor the argument for human capital. Since individuals with the diploma credential only have higher wages in comparison to GED recipients or dropouts with fewer years of schooling (but not to those with similar years of schooling), this could suggest that higher wages are a result of human capital acquisition.

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<sup>7</sup>Cameron, Stephen V., and James J. Heckman. “The Nonequivalence of High School Equivalents.” *Journal of Labor Economics*, 11, 1993.

<sup>8</sup>Boesel, David, Nabeel Alsalam, and Thomas Smith. “Research Synthesis: Educational and Labor Market Performance of GED Recipients.” *U.S. Department of Education*. 1998. <<http://www.ed.gov/PDFDocs/GED/gedfront.pdf>>.

<sup>9</sup>Tyler, John H., Richard J. Murnane, and John B. Willett. “Estimating the Labor Market Signaling Value of the GED.” *The Quarterly Journal of Economics*, 115, 2000(b)

<sup>10</sup>Boesel, David, Ibid.

<sup>11</sup>Cameron, Stephen V., Ibid.

Other studies of the returns to the GED are not consistent with Cameron and Heckman. Tyler, Murnane, and Willett (2000 b) observe only young white dropouts on the margin of passing the GED exam in 1990.<sup>12</sup> The study finds that the signaling value of the GED increased 1995 earnings of young white dropouts on the margin of passing these exams by 10-19 percent, possibly suggesting that GED effects are concentrated among the least skilled dropouts. Another study done by Tyler, Murnane, and Willett (2000 a) divides those who took the GED according to their score on the test.<sup>13</sup> It finds that for all demographic groups except for white males, higher GED scores are associated with higher earnings.

This paper updates Cameron and Heckman's study and provides contrasting results. While Cameron and Heckman use NLSY data from 1978, I update this study by using CPS data from 1999-2006 to provide evidence on the effect of the GED in more recent years. I also modify the model by including another variable - highest grade completed by individual - which will control for educational level effects. I find that GED recipients do earn higher wages than dropouts and that the GED helps eighth grade dropouts more than twelfth grade dropouts. Also, this study finds that the GED is insignificant when it comes to affecting labor force participation and employment but may increase one's chances of being in a higher-paying occupation. This could mean that the labor market has changed or that perhaps the human capital gains or signaling that result from GED attainment have begun to play more of a role in the labor market in more recent years. These results provide evidence that this high school "equivalent" might actually be advantageous for labor market outcomes.

## II. Data and Theoretical Models

The data used for this study are from the Current Population Survey conducted by the U.S. Bureau of Labor Statistics. The sample is limited to male U.S. citizens from ages 25-65 from the years 1999-2006. I chose this age limit because it allows the individuals in the sample to have received their GED and started working while eliminating men of retirement age. Male U.S. citizens were chosen to eliminate the effect of immigration in the labor force and because males generally have a more continuous employment record than

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<sup>12</sup>Tyler, John H., Richard J. Murnane, and John B. Willett. "Estimating the Labor Market Signaling Value of the GED." *The Quarterly Journal of Economics*, 115, 2000(b).

<sup>13</sup>Tyler, John H., Richard J. Murnane, and John B. Willett. "Do the Cognitive Skills of School Dropouts Matter in the Labor Market?" *The Journal of Human Resources*, 35, 2000(a).

females. The sample is further limited to respondents who left school prior to obtaining a diploma, who have a GED, or who received a high school diploma. There are no individuals in the sample who have gone beyond the GED to receive higher education.

Tables 1 and 2 provide summary statistics for the sample used in this study.<sup>14</sup> Table 1 indicates that the mean hourly wage is \$17.71 in 2006 dollars. Each grade level variable indicates the highest grade level attained by the individual. Twenty-two percent of the sample are non-GED recipient dropouts, 9 percent have a GED, and 69 percent have a diploma. Table 2 reports mean GED attainment by grade level. Eleven percent of 8<sup>th</sup> grade dropouts have obtained a GED while 38 percent of 11<sup>th</sup> grade dropouts have done so.

### Models:

Model 1 estimates the effect of GED attainment on wages controlling for the number of years of schooling completed, where effects are relative to high school diploma recipients. In addition to the educational variables of interest, **X** includes controls for age, race, geographical location, marital status, children, government employment, occupation, industry, and year variables. The coefficient of each grade level indicates the percent difference in wages that dropouts (of that certain grade level with no GED) earn in relation to diploma recipients. The coefficient of the GED variable adds to each of the grade level coefficients to indicate the percent difference in wages of dropouts (of that certain grade level with a GED) in relation to diploma recipients.

$$\text{Log}(\text{wage}) = (\alpha X) + \beta_1 \text{grade}8 + \beta_2 \text{grade}9 + \beta_3 \text{grade}10 + \beta_4 \text{grade}11 + \beta_5 \text{grade}12 + \beta_6 \text{GED} + \varepsilon \quad (1)$$

In Model 2, I interact grade level with GED. To determine the effect on wages of obtaining a GED, the coefficient of each grade level must be added to the coefficient of GED and to the coefficient of each interaction term. This allows for changing effects by grade level.

$$\text{Log}(\text{wage}) = (\alpha X) + \beta_1 \text{grade}8 + \beta_2 \text{grade}9 + \beta_3 \text{grade}10 + \beta_4 \text{grade}11 + \beta_5 \text{grade}12 + \beta_6 \text{GED} + \beta_7 \text{ged} \times \text{grade}9 + \beta_8 \text{ged} \times \text{grade}10 + \beta_9 \text{ged} \times \text{grade}11 + \beta_{10} \text{ged} \times \text{grade}12 + \varepsilon \quad (2)$$

Model 3 is a probit model of labor force non-participation. It uses the same independent variables as Model 1 to determine the effect of the GED on the likelihood of being in the labor force. Model 4 is a similar probit that tests whether or not an individual is more or less likely to be employed, using the

<sup>14</sup> Wages below the federal minimum of \$2.13 were dropped.

same independent variables as Model 1 but limiting the sample to those in the labor force.

Finally, I run probits that test the effect of GED attainment on the likelihood of being in a certain occupation. I use the same variables as the above models. Occupations include: professional, managerial, and technical, services, sales, blue collar, farming, and labor.

### III. Results

Model 1 estimates the effect of GED attainment on wages controlling for the number of years of schooling completed. Effects are relative to recipients of a high school diploma. The results, which are reported in Table 3 (first column), suggest that high school dropouts with no GED receive significantly lower wages than diploma recipients. This wage differential decreases as the grade level at which the individual dropped out increases. An eighth grade dropout with no GED earns 27 percent less than a diploma recipient, while a twelfth grade dropout with no GED earns 16 percent less than a diploma recipient. Recipients of a GED earn less than diploma recipients but about 13 percent more than dropouts with no GED. An eighth grade dropout with a GED earns only 15 percent less than a diploma recipient as opposed to 27 percent less without a GED. A twelfth grade dropout with a GED earns only 4 percent less than a diploma recipient as opposed to 16 percent less without a GED. Results are statistically significant. This is noteworthy in that it suggests that a GED is beneficial in the labor market. A GED increases one's wages in comparison to those without a GED who dropped out in the same grade level.

It may be the case that the impact of a GED varies with the number of years of education received prior to dropping out. Model 2 allows for the interaction of GED with the highest grade level attained by the recipient. Table 3 (second column) contains the results, which are statistically significant, and still show that high school dropouts with no GED receive significantly lower wages than diploma recipients. These wage differentials are very similar to those of Model 1. An eighth grade dropout with no GED earns 28 percent less than a diploma recipient. A twelfth grade dropout with no GED earns 15 percent less than a diploma recipient. When grade level and GED are interacted, results show that a GED seems to help an eighth grade dropout more than a twelfth grade dropout. An eighth grade dropout with a GED earns 10 percent less than a diploma recipient and a twelfth grade dropout with a GED earns 6 percent less than a diploma recipient. Therefore, an eighth grade dropout increased wages by 18 percent in relation to diploma recipients when a GED is obtained. A twelfth grade dropout increased wages by only 9 percent. This indicates that the effect of GED attainment varies with the grade at which a

dropout leaves school.

These results are quite different from those of Cameron and Heckman (1993)<sup>15</sup>. Whereas Cameron and Heckman found that in 1978, GED recipients had indistinguishable labor market outcomes from dropouts, I found that in recent years, GED recipients do earn higher wages than dropouts in comparison to diploma recipients. Possibly, the increase in human capital or the signaling device that comes from the GED bears more weight in the labor market in more recent years. Also, I use CPS data, include more variables, and include a wider age range. These could all contribute to the different results. It may also be the case that the characteristics of dropouts and GED takers have been changing. Cameron and Heckman began their study relatively soon after the Vietnam War. Perhaps many of the men that fought in the war experienced a disruption in their educational attainment that could have affected both education level and labor force status. In the mid to late 1970s, half of U.S. soldiers had not finished high school, whereas in 2003 only 6 percent of army soldiers lacked a high school graduation credential.<sup>16</sup> My study is more consistent with Tyler, Murnane, and Willett's findings. Although they looked at young white dropouts on the margin of passing the GED exam in 1990, they also found higher wages associated with those who received their GED.

The mechanism through which GED attainment is associated with higher wages remains unclear. The GED could be a signal to employers that an individual is more qualified, motivated, or able to work. Along these lines, GED takers may be more motivated than non-takers. Therefore, the more motivated individuals take the test, which then helps their labor market status. Another explanation is that the GED recipient actually gains more human capital while studying for the test, which makes the individual more productive in the work place. While it is not possible to distinguish between these theories with these data, the results of both models indicate that GED attainment is associated with increased wages. Moreover, the results of Model 2 provide some insight into the distinction between signaling and human capital formation. Results indicate that the GED still helps twelfth grade dropouts in their labor market outcomes. It is possible that a twelfth grade dropout has almost as much (if not the same) level of human capital as high school graduates. Yet, the GED still helps them, indicating that the GED may be seen as a signal to employers. Also, eighth grade dropouts are helped significantly more by the GED

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<sup>15</sup> Cameron, Stephen V., and James J. Heckman. "The Nonequivalence of High School Equivalents." *Journal of Labor Economics*, 11, 1993.

<sup>16</sup> Kaplan, Fred. "The Dumbing-Down of the U.S. Army and Some Modest Proposals for Countering the Trend." *Slate Magazine*, 2005. <<http://www.slate.com/id/2127487/>>.

than any other grade level. Eighth grade dropouts never attended high school. Therefore, they may have significantly less human capital than an eleventh or twelfth grade dropout. Perhaps these eighth grade dropouts then benefit more from the signal of the GED. It could also be the case that eighth grade dropouts are more motivated to obtain a GED because they believe it will help them more in the labor market, having dropped out so early.

These estimates of the return to a GED may be biased upward because of the issue of ability. It may be the case that more able dropouts—who also tend to earn higher wages—are the ones who are choosing to take the GED. Heckman and LaFontaine (2006) suggest that estimates of GED returns using CPS data are biased upward because there is no available measure of ability and that Cameron and Heckman's (1993) study is preferable because they use the AFQT test to proxy for ability.<sup>17</sup> However, as often pointed out in the literature, AFQT is not a clear measure of innate ability and likely also reflects learned knowledge and skills.<sup>18</sup> In this case, AFQT scores will be positively correlated with GED attainment not because of innate ability; but because they are another measure of human capital acquisition, and including them in the regression model may lead to underestimation of the effect of the GED. The Cameron and Heckman results may provide a lower bound for the true effect of the GED while these may provide an upper one.

Model 3 tests the effects of GED attainment on labor force participation in relation to diploma recipients. Results, which are shown in Table 4, indicate that dropouts are more likely to be “not in the labor force” (less likely to be in the labor force) than diploma recipients. A ninth grade dropout is 1.7 percentage points less likely to be in the labor force, while a twelfth grade dropout is 0.9 percentage points less likely to be in the labor force than a diploma recipient. However, the results do not indicate an association between GED and participation.

Model 4 tests the effects of GED attainment on employment. Results (displayed in Table 4) show that dropouts are less likely to be employed than diploma recipients. In particular, a ninth grade dropout is 4.6 percentage points less likely to be employed, while a twelfth grade dropout is 1.8 percentage points less likely to be employed. But again, the GED coefficient is statistically insignificant and small, indicating that a GED plays little role in employment.

I next report the results of a series of probits to explain whether the

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<sup>17</sup> Heckman, James J. and Paul A. LaFontaine. “Bias-Corrected Estimates of GED Returns.” *Journal of Labor Economics*, 24, 2006.

<sup>18</sup> Neal, Derek A., and William R. Johnson. “The Role of Premarket Factors in Black-White Wage Differences.” *The Journal of Political Economy*, 1996.

GED has an effect on the likelihood of working in a particular occupation.<sup>19</sup> From Table 5, it is apparent that dropouts with no GED are more likely to have a farming and labor occupation over diploma recipients. These two occupations are lower-skilled and lower-paying. Furthermore, dropouts with no GED are less likely to have a professional, managerial, and technical, sales, or blue collar occupation over diploma recipients. These occupations are classified as higher-skilled and higher-paying. Results suggest that a GED decreases the probability of one working in these lower-skilled occupations and moves them into higher-skilled occupations. One should note that the causality is not completely certain here. It may be the case that the GED assists individuals with moving into higher-skilled occupation. Alternatively, individuals in higher-skilled occupations may be more likely to take the GED exam because they expect higher returns.

These findings are important in a larger sense in that they indicate that the GED may increase one's wages relative to dropouts as well as increase one's probability of moving into a higher paying occupation. GED attainment appears to be especially important for those individuals who dropped out early in high school. Perhaps states should make it easier for people to take these tests by lowering fees or increasing the number of test centers. If the GED really is becoming increasingly advantageous in labor market outcomes, then more stress should be put on the importance of these tests.

#### **IV. Conclusions**

Estimates using CPS data from 1999-2006 suggest that dropouts without a GED earn statistically significantly lower wages than high school diploma recipients. Dropouts who do obtain their GED offset this negative wage differential by an average of 13%. When allowing for effects to vary by highest grade level achieved, results suggest that a GED helps eighth grade dropouts more than it helps twelfth grade dropouts in terms of wages. These findings differ from those of Cameron and Heckman using NLSY data from 1978, where there was no difference in wages of high school dropouts and GED recipients.<sup>20</sup> This suggests that in more recent years, the GED may be more beneficial in its translation into higher wages in the labor market.

In addition, this study finds that dropouts are less likely to be in the labor force and less likely to be employed compared to diploma recipients.

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<sup>19</sup> Probit models of industry selection were also done, but results were similar to those of occupation selection.

<sup>20</sup> Cameron, Stephen V., and James J. Heckman. "The Nonequivalence of High School Equivalents." *Journal of Labor Economics*, 11, 1993.

However, the results suggest that the GED has no effect on either labor force participation or employment but that the GED may increase one's chances of being in a higher-paying occupation.

These results may hint that the GED could be more of a signaling device. However, it is inconclusive whether the GED's effect on the labor market is because of its signaling value or because the test-takers studying for the test are actually acquiring more human capital. Also, the association of a GED with higher wages could be because higher ability individuals are the ones who are seeking a GED. An interesting future study could be one that controls for ability or instruments for GED attainment, perhaps by using some natural experiment that made it easier or cheaper for one group to get the GED. The GED still may not be the high school diploma "equivalent" that it claims to be; but it may be becoming increasingly more equivalent, at least in terms of labor market success.

**Table 1: Summary statistics**

	<b>Obs.</b>	<b>Mean</b>	<b>Std. Dev</b>	<b>Min.</b>	<b>Max.</b>
wage	182,234	17.71	9.40	2.14	513
age	270,036	44.21	11.17	25	65
north	270,036	0.21	0.41	0	1
south	270,036	0.34	0.47	0	1
west	270,036	0.19	0.40	0	1
central	270,036	0.25	0.44	0	1
white	270,036	0.78	0.41	0	1
black	270,036	0.12	0.33	0	1
other	270,036	0.04	0.18	0	1
hispanic	270,036	0.06	0.24	0	1
married	270,036	0.61	0.49	0	1
children	270,036	0.29	0.45	0	1
grade8	270,036	0.06	0.24	0	1
grade9	270,036	0.04	0.20	0	1
grade10	270,036	0.08	0.27	0	1
grade11	270,036	0.10	0.29	0	1
grade12	270,036	0.04	0.19	0	1
GED	270,036	0.09	0.29	0	1
diploma	270,036	0.69	0.46	0	1

**Table 2: Summary statistics:  
Mean GED attainment by grade level**

	<b>Obs.</b>	<b>Mean</b>	<b>Std. Dev.</b>
<b>If grade 8</b>	16,105	0.11	0.32
<b>If grade 9</b>	11,259	0.24	0.43
<b>If grade 10</b>	20,554	0.32	0.47
<b>If grade 11</b>	25,891	0.38	0.49
<b>If grade 12</b>	10,557	0.34	0.48

<b>Table 3: OLS Model of Log-Wages</b>		
	<b>Model 1</b>	<b>Model 2</b>
grade8	-0.271***	-0.280***
	(0.006)	(0.006)
grade9	-0.240***	-0.239***
	(0.006)	(0.007)
grade10	-0.201***	-0.198***
	(0.004)	(0.005)
grade11	-0.181***	-0.185***
	(0.004)	(0.004)
grade12	-0.162***	-0.149***
	(0.006)	(0.007)
GED	0.126***	0.179***
	(0.004)	(0.014)
gedxgrade9		-0.057***
		(0.019)
gedxgrade10		-0.062***
		(0.016)
gedxgrade11		-0.043***
		(0.016)
gedxgrade12		-0.088***
		(0.018)
R-squared	0.190	0.190
n	182,234	182,234

Standard errors in parentheses are robust. \* $p < 0.10$   
 \*\* $p < 0.05$  \*\*\* $p < 0.01$ . All regressions include  
 controls for age, geographical location, race, marital  
 status, children, occupation, industry, government  
 employment, and years.

**Table 4: Model 3 probit of not in labor force and Model 4 probit of employment**

	nilf	employment
grade8	0.013*** (0.002)	-0.026*** (0.003)
grade9	0.017*** (0.002)	-0.046*** (0.004)
grade10	0.015*** (0.002)	-0.033*** (0.002)
grade11	0.013*** (0.002)	-0.032*** (0.002)
grade12	0.009*** (0.002)	-0.018*** (0.003)
GED	0.000 (0.001)	0.001 (0.002)
n	215,506	208,646

Standard errors in parentheses are robust. \*p<0.10 \*\*p<0.05 \*\*\*p<0.01. All regressions include control for age, geographical location, race, marital status, children, occupation, industry, government employment, and years.

**Table 5: probit models of occupation selection**

	professional, managerial, technical	services	sales	bluecollar	farming	labor
grade8	-0.071*** (0.002)	0.047*** (0.004)	-0.046*** (0.002)	-0.035*** (0.002)	0.046*** (0.003)	0.091*** (0.005)
grade9	-0.068*** (0.002)	0.025*** (0.004)	-0.044*** (0.002)	-0.030*** (0.002)	0.027*** (0.003)	0.121*** (0.005)
grade10	-0.066*** (0.002)	0.017*** (0.003)	-0.040*** (0.001)	-0.027*** (0.002)	0.018*** (0.002)	0.121*** (0.004)
grade11	-0.055*** (0.002)	0.014*** (0.003)	-0.034*** (0.001)	-0.026*** (0.001)	0.011*** (0.001)	0.104*** (0.004)
grade12	-0.037*** (0.003)	0.017*** (0.004)	-0.025*** (0.002)	-0.020*** (0.002)	0.008*** (0.002)	0.064*** (0.006)
GED	0.053*** (0.004)	-0.003 (0.003)	0.023*** (0.003)	0.027*** (0.003)	-0.011*** (0.001)	-0.055*** (0.005)
n	208,646	208,646	208,646	208,646	208,646	208,646

Standard errors in parentheses are robust. \*p<0.10 \*\*p<0.05 \*\*\*p<0.01. All regressions include controls for age, geographical location, race, marital status, children, government employment, and years.

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