

# Labor Market Effects of a High School Diploma – A Racial Approach

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## 1. Introduction

Those with higher levels of educational attainment will generally earn a higher average wage than those with less education.<sup>1</sup> As a financial motivator, this would be expected to provide an incentive to pursue higher education. Higher education is likely one of the more secure ways of ensuring one's future financial wellbeing. The most financially at-risk group, from an educational standpoint, are those who fail to complete high school. In 2009, 30.1% of high school dropouts ages 18-24 were living in poverty compared to only 23.7% of those who graduated with a high school diploma.<sup>2</sup> While there is likely some correlation between financial wellbeing and the ability to complete high school, the future ramifications of dropping out of high school are nonetheless of interest. Simply finding a job presents an increased difficulty for those with no high school diploma. In 2012, the national average unemployment rate reached 8.1%.<sup>3</sup> While those without a high school diploma were unemployed at a rate of 12.4%, graduating high school reduced this rate to 8.4%.<sup>4</sup>

In America there exists an alarmingly large disparity in educational attainment. In 1992, the national average high school dropout rate amongst all races was 11.2%, a number which has fallen fairly consistently to 6.6% in 2012.<sup>5</sup> Racial minorities, however, generally experience a higher high school dropout rate than their white counterparts; the highest being Hispanics, followed by Blacks. While white Americans had a dropout rate of only 4.3% in 2012, Hispanics and Blacks had dropout rates of 12.7% and 7.5% respectively.<sup>6</sup> This disparity points to a problem in educational equity in America. Although the national high school dropout rate has decreased significantly over the past 20 years, disparity in educational attainment across races remains prevalent. White graduates tend to be employed significantly more than all other races; however, research suggests that over time black youth experience a greater increase in labor force participation though earning a high school diploma than Whites.<sup>7</sup> As a means of decreasing financial inequality across races it is important that all students remain in school and is therefore

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<sup>1</sup> "Earnings and Unemployment Rates by Educational Attainment." *U.S. Bureau of Labor Statistics*. N.p., 24 Mar. 2014.

<sup>2</sup> "America's Youth: Transition to Adulthood." *Nation Center for Education Statistics*. 2010.

<sup>3</sup> "Labor Force Statistics CPS Survey." *U.S. Bureau of Labor Statistics Data*. 2013.

<sup>4</sup> "Labor Force Statistics CPS Survey." *U.S. Bureau of Labor Statistics*. 26 Feb. 2014.

<sup>5</sup> "2012 NCES Digest." *Nation Center for Education Statistics*. May 2013.

<sup>6</sup> "2012 NCES Digest." *Nation Center for Education Statistics*. May 2013.

<sup>7</sup> McDaniel, Marla, and Daniel Kuehn. "What Does a High School Diploma Get You? Employment, Race, and the Transition to Adulthood." *The Review of Black Political Economy* 40.4 (2013): 371-99. *The Review of Black Political Economy*.

imperative that racial minorities receive the same education as their white counterparts. The importance of graduating high school is reflected in the future job opportunities it creates. The purpose of this paper is to examine the labor market effects of earning a high school diploma across races.

## **2. Lit Review**

McDaniel & Kuehn (2012) examine the labor force effects of obtaining a high school diploma. Rather than looking at wages, they focus on employment differences. All respondents are either high school dropouts or graduates with no college experience, so wage differences are assumed to be unsubstantial. Assuming most high school graduates work for a relatively low wage, consistency of work is likely a better measure of financial wellbeing than actual wage rates. Using NLSY97 data from youth ages 18-22 who are transitioning into adulthood, McDaniel & Kuehn (2012) use an OLS regression to analyze differences in the proportion of weeks worked full time. They find that white high school graduates work significantly more than all other groups, while black high school dropouts work significantly less than all other groups. However, they find that the long-run increase in labor market participation from earning a high school diploma is higher for Blacks than it is for Whites. That is to say, black students have more to gain by completing high school than their white counterparts.

Campolieti, Fang & Gunderson (2009) examine the effects dropping out of high school has on future wages and employment. They focus on labor market outcomes for young adults ages 22-24 using Youth in Transition Survey (YITS) data from 2003. Overall, analysis indicates that high school dropouts have lower wages and fewer employment opportunities than those who graduate; a disadvantage that is not made up for through additional training. This paper will analyze both employment consistency and differences in earnings to determine which has the most economically significant effect.

## **3. Data**

All analyses uses Current Population Survey (CPS) data available through Integrated Public Use Microdata Series (IPUMS). All observations represent adults who either graduated or dropped out of high school but have no college education. Data include observation from 2003-2008, however CPS asks questions about the previous year, so observations represent financial information from 2002-2007; a period when the United States was not in a recession. Data is limited to persons 30-39 years of age to ensure participants are not still working towards earning a degree. This will give insight into the financial benefits of graduating high school during a respondent's middle-aged years.

The dependent variable, *Weeks*, in the initial regression represents the number of weeks worked in the previous year. An alternate dependent variable, *Hours*, represents the usual number of hours worked per week in the previous year. Dummy variables are included for race, gender, educational attainment, and country of birth. Analysis indicates differences in the number of weeks and hours worked between high school graduates and dropouts in their 30's. Data includes 52,201 observations.

The variable *Race* contains responses with upwards of five different races. For analyses purposes, I categorize *Race* into five dominant subgroups: Black, Native American, Hispanic, White and Asian. Individuals of mixed races are placed into the subgroup that best represents their minority status. Due to the possibility that some observations could be categorized into multiple subgroups, I drop all responses containing upwards of three races. The ethnicity *Hispanic* is grouped under the race *White* and differentiates between Whites and Hispanics. The race variable *Hispanic* therefor includes both white and non-white Hispanics.

Summary Table for weeks worked and hours worked regressions:

<b>Variable</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>	<b>Median</b>
<b>Year</b>	2005	1.71	2003	2008	2005
<b>Age</b>	35	2.87	30	39	35
<b>Weeks</b>	46.66	12.91	0	52	52
<b>Hours</b>	39.01	12.20	0	98	40
<b>Male</b>	0.57	0.50	0	1	1
<b>Female</b>	0.43	0.50	0	1	0
<b>Graduate</b>	0.81	0.39	0	1	1
<b>Dropout</b>	0.19	0.39	0	1	0
<b>White</b>	0.59	0.49	0	1	1
<b>Black</b>	0.13	0.34	0	1	0
<b>Hispanic</b>	0.22	0.41	0	1	0
<b>Asian</b>	0.04	0.19	0	1	0
<b>Native American</b>	0.02	0.16	0	1	0
<b>USA</b>	0.78	0.41	0	1	1
<b>Foreign</b>	0.22	0.41	0	1	0

An additional regression is used to analyze wage-rate effects using hourly wages as a dependent variable. Dummy variables are included for race, gender, educational attainment, and country of birth. To observe differences in wages, observations include only those who earn an hourly wage. Due to a lack of data on earnings of tipped workers, I drop all hourly wage observations below \$5.15, the federal minimum wage in 2002. Analyses indicates differences in hourly wages of high school graduates and dropouts in their 30's. Data includes 5,683 observations.

Summary Table for hourly wage regression:

<b>Variable</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>	<b>Median</b>
<b>Year</b>	2005	1.72	2003	2008	2005
<b>Age</b>	35	2.91	30	39	35
<b>Wage</b>	13.02	5.77	5.15	99.00	11.90
<b>Income</b>	26,788.94	21,592.50	0.00	579,599.00	24,000.00
<b>Male</b>	0.54	0.50	0	1	1
<b>Female</b>	0.46	0.50	0	1	0
<b>Graduate</b>	0.83	0.38	0	1	1
<b>Dropout</b>	0.17	0.38	0	1	0
<b>White</b>	0.64	0.48	0	1	1
<b>Black</b>	0.15	0.35	0	1	0
<b>Hispanic</b>	0.15	0.36	0	1	0
<b>Asian</b>	0.03	0.18	0	1	0
<b>Native American</b>	0.03	0.16	0	1	0
<b>USA</b>	0.83	0.38	0	1	1
<b>Foreign</b>	0.17	0.38	0	1	0

“*Education*” is a dummy variable that takes on the value ‘1’ if respondent graduated high school and takes on the value ‘0’ otherwise.

“*Gender*” is a dummy variable that takes on the value ‘1’ if the respondent is female and takes on the value ‘0’ otherwise.

“*Black*” is a dummy variable that takes on the value ‘1’ if the respondent is Black and takes on the value ‘0’ otherwise.

“*Hispanic*” is a dummy variable that takes on the value ‘1’ if the respondent is Hispanic and takes on the value ‘0’ otherwise.

“*Asian*” is a dummy variable that takes on the value ‘1’ if the respondent is Asian and takes on the value ‘0’ otherwise.

“*Native American*” is a dummy variable that takes on the value ‘1’ if the respondent is Native American and takes on the value ‘0’ otherwise.

#### 4. Methodology

A series of OLS regressions are used to explain employment benefits from earning a high school diploma. An initial set of regressions uses *Weeks* and *Hours* as dependent variables and analyzes trends in employment differences on both a weekly and hourly basis. Rather than wages, weekly and hourly employment are used as an indicator because all respondents have similar levels of education — either high school graduates or dropouts. As none of the respondents attended college, wage differences are assumed to be minimal. The initial regressions show differences in employment consistency, an important aspect for low-wage workers. These equations are constructed as follows:

$$\text{Weeks} = \beta_0 + \beta_1\text{Year} + \beta_2\text{Age} + \beta_3\text{Drop} + \beta_4\text{Female} + \beta_5\text{Black} + \beta_6\text{Hispanic} + \beta_7\text{Hispanic} + \beta_8\text{Native\_American} + \beta_9\text{Birth} + \epsilon_i$$

$$\text{Hours} = \beta_0 + \beta_1\text{Year} + \beta_2\text{Age} + \beta_3\text{Drop} + \beta_4\text{Female} + \beta_5\text{Black} + \beta_6\text{Hispanic} + \beta_7\text{Hispanic} + \beta_8\text{Native\_American} + \beta_9\text{Birth} + \epsilon_i$$

An additional regression is used to analyze differences in wage-rates. Rather than employment, *Wage* is used to explain the dollar effects of earning a high school diploma. Although wage differences are assumed to be minimal, we still expect high school graduates to earn more than dropouts. Holding education constant, the coefficients on the dummy variables allow us see differences across race and gender. Assuming equal qualifications, the coefficients on race and gender imply statistical discrimination on the side of the employer. Holding all else equal, we expect to see lower wages for both women and racial minorities. This equation is constructed as follows:

$$\text{Wage} = \beta_0 + \beta_1\text{Year} + \beta_2\text{Age} + \beta_3\text{Drop} + \beta_4\text{Female} + \beta_5\text{Black} + \beta_6\text{Hispanic} + \beta_7\text{Hispanic} + \beta_8\text{Native\_American} + \beta_9\text{Birth} + \epsilon_i$$

Employment Regressions:

	<i>Adj R-squared = 0.0279</i>					
<b>Weeks</b>	<b>Coef.</b>	<b>Std. Err.</b>	<b>t</b>	<b>P&gt; t </b>	<b>[95% Conf. Interval]</b>	
<b>Year</b>	0.08418	0.03270	2.570	0.010	0.02008	0.14828
<b>Age</b>	0.14706	0.01946	7.560	0.000	0.10892	0.18521
<b>Female</b>	-2.99629	0.11300	-26.520	0.000	-3.21777	-2.77482
<b>Dropout</b>	-3.34736	0.22161	-15.100	0.000	-3.78173	-2.91300
<b>Black</b>	-2.02594	0.18747	-10.810	0.000	-2.39339	-1.65849
<b>Hispanic</b>	-0.46160	0.19634	-2.350	0.019	-0.84643	-0.07678
<b>Asian</b>	-0.68857	0.35070	-1.960	0.050	-1.37594	-0.00120
<b>Native American</b>	-4.02352	0.41892	-9.600	0.000	-4.84461	-3.20244
<b>Foreign</b>	0.45919	0.18116	2.530	0.011	0.10411	0.81427
<b>Black*Dropout</b>	-1.00370	0.47023	-2.130	0.033	-1.92535	-0.08205
<b>Hispanic*Dropout</b>	1.08722	0.33420	3.250	0.001	0.43219	1.74225
<b>Asian*Dropout</b>	1.22715	0.80018	1.530	0.125	-0.34122	2.79551
<b>Native*Dropout</b>	1.05059	0.83706	1.260	0.209	-0.59007	2.69124
<b>_cons</b>	43.58528	0.68899	63.260	0.000	42.23486	44.93571

An initial regression on number of weeks worked supports the hypothesis that earning a high school diploma increases the expected number of weeks worked during the year. Additionally, we find that women work on average about 3 weeks less than men. This is unsurprising however, as women in their 30's can be expected to spend increased time caring for children. All variables except are shown to be statistically significant at the 5% level. A positive coefficient on the variable foreign-born suggests that being born outside of the U.S. increases an individual's expected number of weeks worked. Including interaction terms between race and education shows that Blacks experience a greater increase in employment through graduating high school, equal to around one week, while Hispanics experience a decrease, also equal to approximately a week. Interactions between Asian dropouts and Native American dropouts are insignificant. An R-Squared value of .0279, however, suggests the regression may not do the best job of explaining the data.

Adj R-squared = 0.0900

Hours	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
Year	0.04426	0.02990	1.480	0.139	-0.01433	0.10286
Age	0.10384	0.01779	5.840	0.000	0.06896	0.13871
Female	-7.03511	0.10330	-68.110	0.000	-7.23757	-6.83265
Dropout	-1.98620	0.20259	-9.800	0.000	-2.38328	-1.58912
Black	-1.60164	0.17138	-9.350	0.000	-1.93755	-1.26573
Hispanic	-0.73477	0.17949	-4.090	0.000	-1.08657	-0.38297
Asian	-0.73754	0.32060	-2.300	0.021	-1.36591	-0.10917
Native	-1.92117	0.38296	-5.020	0.000	-2.67178	-1.17055
Foreign	-0.41588	0.16561	-2.510	0.012	-0.74048	-0.09127
Black*Dropout	-1.07782	0.42987	-2.510	0.012	-1.92036	-0.23527
Hispanic*Dropout	0.47087	0.30551	1.540	0.123	-0.12794	1.06969
Asian*Dropout	0.48143	0.73150	0.660	0.510	-0.95233	1.91518
Native*Dropout	-0.04451	0.76522	-0.060	0.954	-1.54434	1.45533
_cons	39.24484	0.62985	62.310	0.000	38.01032	40.47936

An additional regression on number of hours worked during the week renders similar results. While gender appears to have the largest effect of hours worked, all variables except year are shown to be significant at the 5% level. Interestingly, we've now got a negative coefficient on the foreign-born. This suggests that while foreign born respondents are expected to work more weeks, they're also expected to work fewer hours per week than their native born counterparts. Including interaction terms between race and education once again shows that Blacks are expected to experience a greater increase in number of hours worked through graduating high school than Whites, in this case by around one hour. Interactions between education and other minority races are all insignificant. Although the adjusted R-Square valued increased to .0900, it remains fairly low and thus does not do an excellent job of explaining the data.

Wage Regression:

*Adj R-squared = 0.2068*

<b>Log(Hourly Wage)</b>	<b>Coef.</b>	<b>Std. Err.</b>	<b>t</b>	<b>P&gt; t </b>	<b>[95% Conf. Interval]</b>	
<b>Year</b>	0.02073	0.00275	7.550	0.000	0.01534	0.02611
<b>Age</b>	0.01355	0.00161	8.390	0.000	0.01038	0.01671
<b>Female</b>	-0.29500	0.00945	-31.230	0.000	-0.31352	-0.27648
<b>Dropout</b>	-0.20025	0.01760	-11.380	0.000	-0.23474	-0.16576
<b>Black</b>	-0.12134	0.01469	-8.260	0.000	-0.15014	-0.09253
<b>Hispanic</b>	-0.06171	0.01891	-3.260	0.001	-0.09878	-0.02465
<b>Asian</b>	-0.07957	0.03068	-2.590	0.010	-0.13970	-0.01943
<b>Native American</b>	-0.06875	0.03529	-1.950	0.051	-0.13794	0.00045
<b>Foreign Born</b>	-0.08181	0.01660	-4.930	0.000	-0.11436	-0.04926
<b>Black*Dropout</b>	0.03254	0.03981	0.820	0.414	-0.04549	0.11058
<b>Hispanic*Dropout</b>	0.06459	0.03052	2.120	0.034	0.00477	0.12442
<b>Asian*Dropout</b>	0.09808	0.06952	1.410	0.158	-0.03820	0.23436
<b>Native*Dropout</b>	0.03149	0.06662	0.470	0.636	-0.09911	0.16209
<b>_cons</b>	2.18213	0.05699	38.290	0.000	2.07041	2.29385

A third regression on wage-rates as opposed to employment yields slightly more interesting results. When regressing on the log of hourly wages, all variable are shown to be significant at the 5% level. Once again, gender appears to have the largest effect on earnings; in this case women are expected to earn almost 30% less than men. Race also appears to have a real effect on wages; while Hispanics earn 4.6% less per hour, Asians and Native Americans earn around 6.5% less, and Blacks earn 11.7% less. Interestingly, the coefficient on foreign-born is once again negative, indicating that foreign born respondents earn less than those born in America. Interaction terms between race and education are insignificant, so different races are not expected to gain different levels of benefits through graduation. None the less, different races are expected to receive different wage rates.

## 5. Results/Conclusions

The regressions support the hypothesis that high school graduates experience increased labor market benefits over those who drop out. The initial regressions on *Weeks and Hours*, although they have fairly low adjusted R-squared values, show differences in work consistency. Although



income differences exist, simply working consistent weeks and hours is an important step in achieving financial stability. Additional insight is given into the racial differences in earning a diploma; although insignificant in predicting wage-rates, racial minorities generally experience a greater improvement in both weeks worked per year and hours worked per week. All regressions suggest that gender is the largest determinant of both future employment and wages amongst high school graduates and dropouts. Once again, this isn't entirely surprising, as women in their 30's likely spend increased time raising children. Educational attainment appears significant in all regressions, however the regression on wage-rates has a considerably higher adjusted R-squared value and can be assumed to be the most accurate predictor of the data.

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