



# The gender gap in K-12 educator salaries

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## ABSTRACT

We examine gender gaps in the salaries of K-12 educators. This is an occupation where direct gender discrimination is less likely since salaries are determined by a union pay scale and women constitute the majority of employers. Using data from the American Community Survey (ACS), we find a gender gap of \$12,000 in the personal income of K-12 educators, with only part of this gap stemming from gender differences in administrative positions, graduate degrees, and grades taught. In contrast, when we use a dataset of the public salaries of K-12 educators, we find a raw gender gap that is about three times smaller. When we directly compare the distribution of annual income for male and female educators between the public salary and ACS data, we find that an important part of the gender gap stems from male educators having additional income outside of their primary teaching salary.

## 1. Introduction

Gender pay gaps continue to persist in a broad set of occupations. While the overall gender pay gap has improved over the last few decades, women continue to earn less than men in similar occupations (Blau & Khan, 2007). Some explanations for these gaps include differences in mobility across firms (Ransom & Oaxaca, 2005), labor market experience (Mincer & Polacheck, 1974), and work hours (Bertrand, Goldin, & Katz, 2010). Direct gender discrimination can also play a role, as evidenced by studies that vary the ability to observe the gender of an employee when making promotion decisions (Goldin & Rouse, 2000) or audit studies in which similar men and women apply for the same jobs (Neumark, Bank, & Van Nort, 1996).

In this paper, we examine gender wage gaps among K-12 educators in the US. This is an interesting setting since the majority of employers are women, and thus less likely to discriminate against other women, and salaries are largely set by union pay schedules, leaving less room for direct discrimination than in other fields. It is also meaningful because teacher compensation is low to begin with and declining relative to comparable workers in other occupations (Allegretto & Mishel, 2016). We use personal income data on the 500,000 K-12 educators in the 2005–2014 waves of the American Community Survey and find a gap of almost \$12,000 per year. This gap is reduced by about 30% when we control for being an administrator, having a graduate degree, and the grade level taught. Each of these factors has a large impact on

educators' incomes and suggests ways in which districts could reduce gender pay gaps. These include providing a smaller pay increase for teachers with a graduate degree or creating tracks through which teachers could reach salaries similar to those of administrators.

We also construct a new dataset of public K-12 educators using public employee salary data available from 10 different states over multiple years. This dataset includes a sample of over 6 million teacher-year observations. We find that the raw gender gap in teacher salaries is much smaller—about \$4900—in this sample. When we examine income distributions in both datasets, we find that the income distribution is very similar by gender when looking at public salaries; however, the distributions of male and female salaries are very different when using personal income reported in the ACS. Men are much less likely to report incomes less than \$40,000 and much more likely to report incomes above \$70,000. Since the income reported in the ACS includes income from all jobs, this comparison across datasets suggests that an important source of the gender gap in personal income among teachers may stem from additional sources of income that teachers seek outside of their regular teaching job.

## 2. The gender pay gap

Many past studies on gender pay gaps have focused on specific occupations. Weaver, Wetterneck, Whelan, and Hinami (2015) examine income of hospitalists and find that men make \$14,000 more than

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women, even after accounting for differences in workload and position. Madden (2012) uses data on stockbrokers, showing that women produce sales on par with men when given accounts with equivalent prior sales histories, but a pay gap arises because women are assigned inferior accounts with which to work. Noonan, Corcoran, and Courant (2005) examine data on lawyers and find that women earn 11 percent less than men despite having the same work settings and characteristics.

Other explanations for the gender pay gap that do not involve direct forms of discrimination include differences in college major (Daymont & Andrisani, 1984; Zafar, 2013), differences in the effects of childbearing and childrearing (Budig & England, 2001; Waldfogel, 1998), and differences in work experience (Evers & Sieverding, 2013). Bertrand et al. (2010) use data on MBA graduates and find that men begin to earn more than women within a decade after graduation, with the gap stemming from gender differences in years worked, training, and the number of hours worked.

Several studies identify and explain gender pay gaps in educational settings. Barbezat and Hughes (2005) suggest that part of the gap can be explained by differences in pay structure between institutions, particularly between research and liberal arts universities. Lee and Won (2014) find that a 1% increase in the proportion of women in full professorship at a university is correlated with a \$2,825 decrease in the wage gap. Doucet, Smith, and Durand (2012) suggest that the wage gap is linked to pay structure, female representation, and access to market supplements. Binder, Krause, Chermak, Teacher, and Gilroy (2010) find a discriminatory gender wage gap of about 3% that persists after controlling for productivity measures across university professors.

Most of the studies on gender pay gaps in education have focused on higher education, with very little research on gender pay gaps for K-12 educators. Sohn (2015) uses the 1915 census to identify a large wage gap in the K-12 teaching profession in the early 20th century in Iowa, attributing some of this disparity to discrimination and to a segmented labor market. Ransom and Lambson (2011) show a gender pay gap using data from Missouri and find that part of this gap stems from men being more likely to switch jobs across districts. K-12 education provides an interesting setting to explore the gender wage gap because the majority of people (including most of the decision makers) in this occupation are women, and wages are determined largely on a union pay scale based on experience and level of education.

Podgursky and Springer (2011) use data from 2003 to 2004 and find that 96% of public school districts used a salary schedule to determine compensation. Teachers still have opportunities to supplement their base salary by performing additional duties at the school or taking on a second job. Other sources of discretion in pay can occur when districts provide additional pay to reward excellence in teaching, attract teachers to undesirable locations, or attract teachers from other districts. These additional forms of compensation provide some channels for employers to discriminate by gender. Some gender discrimination might be motivated by a desire for diversity or misperceived value of teachers by gender. In addition, West and Mykerezzi (2011) show that teacher unions influence the factors that contribute to higher pay among teachers. In particular, they find that unions increase the return to experience and graduate degrees for teachers but discourage bonuses based on student performance.

### 3. Data and methodology

We use two datasets to examine gender pay gaps among K-12 educators. First, we use the American Community Survey (ACS) for the years 2005–2014. The ACS is an annual one-percent sample of the US population and includes information on gender, age, occupation, educational attainment, marital status, number of children, and hours worked. Our sample includes individuals who report being a full-time K-12 teacher or administrator. The ACS includes information on whether someone is a secondary school teacher, an elementary or middle

school teacher, or a preschool or kindergarten teacher.<sup>1</sup> We exclude from our sample individuals who report being teacher assistants, special education teachers, or other teachers and instructors, since these other types of positions can vary more across schools and districts. We also exclude postsecondary teachers and administrators from our sample. We measure income using pre-tax wage and salary income and restrict our sample to individuals with at least \$20,000 in income. While income measures are top-coded in the ACS to preserve confidentiality of high wage earners, we find no evidence of top-coding in wages of school teachers.

Second, we use a dataset we created of public salaries for K-12 educators that are available online from 10 different states: California, the District of Columbia, Georgia, Illinois, Kansas, Nevada, Pennsylvania, Utah, Washington, and Wisconsin. These states provide information on the name, district, specific position, and salary of each public school teacher in the state. Illinois and Utah provide gender directly in the data and for the other states we use a name-gender crosswalk to infer an individual's gender based on their first name.<sup>2</sup> Illinois and Wisconsin are unique in providing information on whether the educator has a graduate degree and respectively providing information about experience and age.

The public salary database does not include income sources outside the main salary of the teacher or administrator. Many high school teachers take on additional responsibilities beyond teaching: coaching athletic teams or working as an athletics director, assisting the grounds crew, or helping with clubs or summer programs. In addition, teachers can pursue other employment during the summertime or outside of school hours. As such, public school teachers may exhibit a gender pay gap due to male teacher's greater propensity to take on additional responsibilities, similar to other occupations where men are more likely to work overtime (Cha & Weeden, 2014).

### 4. Results

Summary statistics of ACS data are presented in Table 1. The raw data exhibit a clear gender pay gap. Female teachers' average annual personal wage income is \$52,362 compared to \$59,186 for male teachers. Among administrators, the pay gap is even larger, with female administrators making \$69,657 compared to \$91,365 for male administrators. In the last two columns of Table 1 we restrict the sample to individuals under the age of 35 and without children since this group is unlikely to have lost years of work experience due to childbearing. This noticeably shrinks the raw pay gap, with female teachers receiving \$43,512 compared to \$46,449 for male teachers and female administrators receiving \$49,705 compared to \$55,291 for male administrators. This evidence in raw data indicates that the gender pay gap for educators emerges over time and is likely related to having children.

In Table 2, we provide a regression-based estimate of these gender pay gaps using the ACS data. The results in the first column indicate that across all full-time K-12 educators, the raw gender gap is about \$12,000. As we include additional control variables, this gap drops to about \$8000, but is still large in magnitude and statistically significant. The gap may result from causes other than discrimination. These factors could include men being more likely to have another job outside of the school, and men being more likely to sort into higher paying districts or teach in undesirable locations. Female teachers might also accrue less

<sup>1</sup> The ACS does not record whether a teacher is employed at a private or public school. The National Center for Education Statistics shows that in 2011–2012 men constitute 23.7% of public school teachers and 25.2% of private school teachers. This suggests that selection across public and private schools is unlikely to be strong factor explaining the gender gap.

<sup>2</sup> When we estimate our results using data from Illinois and Utah, we find similar gender pay gaps if we use the person's actual gender or the inferred gender based on their name, suggesting that using a name-based gender is unlikely to bias our results.

**Table 1**  
Summary statistics from ACS, 2005–2014.

	Full sample		Under 35 and no children	
	Male	Female	Male	Female
Teachers				
Income	59,186 (23,885)	52,362 (21,147)	46,449 (17,069)	43,512 (14,988)
Graduate Degree	0.500	0.472	0.343	0.364
Age	44.15 (11.88)	43.79 (11.87)	28.81 (3.45)	27.97 (3.44)
Hours worked/week	43.87 (9.07)	42.35 (8.19)	44.43 (9.23)	43.12 (7.84)
N	103,196	334,135	18,012	55,720
Administrators				
Income	91,365 (58,949)	69,657 (40,346)	55,291 (31,272)	49,705 (24,060)
Graduate Degree	0.650	0.535	0.447	0.432
Age	48.67 (11.11)	48.05 (11.18)	29.56 (3.60)	29.30 (3.58)
Hours worked/week	46.87 (9.69)	44.24 (9.20)	45.58 (10.25)	43.57 (8.41)
N	31,100	50,745	2228	4548

Notes: The sample includes the 2005–2014 waves of the American Community Survey. Income is based on wage and salary income and is measured in 2014 dollars.

experience due to childbearing or childrearing of mothers—a variable we can only proxy with age in these data. The final three columns of Table 2 restrict the data to individuals without children in their household and under the age of 35—again, a sample for which most individuals have never had children. With the full set of controls, the gender pay gap drops to about \$1500. Restricting to the sample of states for which public salary data are available does not qualitatively affect our estimates, nor does controlling for the field of the teacher’s college degree.

In Table 3, we use the public salary data from each state to estimate the gender pay gap. Without controls, the gender pay gap is close to \$5000 in annual salary. As we add controls for the type of teacher or administrator, the coefficient drops to around \$3000. We also use data from Illinois and Wisconsin to control for both graduate degree and either experience or age. In each case, we first estimate the same

**Table 2**  
Gender gaps in personal income for K-12 educators using ACS data (2005–2014).

	Full sample			Under 35 and no children		
Female	–11,602** (108.3)	–8110** (97.9)	–7098** (92.9)	–3345** (145.1)	–2511** (141.9)	–1393** (137.8)
Administrator		20,370** (180.5)	17,443** (168.7)		5080** (330.9)	4154** (314.6)
Master or Ph.D.		13,281** (75.8)	11,186** (73.5)		9200** (123.0)	6467** (125.4)
Elementary/middle school		–225** (83.4)	167* (79.6)		–575** (132.7)	–400** (127.2)
Kindergarten/pre-school		–12,052** (144.2)	–10,027** (143.0)		–9618** (216.4)	–8051** (215.5)
Age			520** (3.1)			1089** (18.3)
Hours worked			541** (5.5)			264** (8.2)
Number of children			581** (32.6)			
Married			1013** (80.0)			1134** (105.5)
N		519,176			80,508	

Notes: The outcome is salary measured in 2014 dollars. Each column includes controls for race and fixed effects for state and year. Restricted to individuals reporting their primary work position as a teacher or administrator. Robust standard errors in parentheses.

\*\*  $p < 0.01$ ,  
\*  $p < 0.05$ .

specification as for the full sample and then include these additional controls to see how the factors influence the estimated gender pay gap. We find that the gender pay gap in Illinois drops by about 44% when we control for graduate degree and experience and in Wisconsin it drops by about 37% when we control for graduate degree and age.

We also examine the gender difference in the distribution of salaries for male and female educators using both the public salary data and the ACS data. For the public salary data, the distribution of salaries is very similar for men and women, with female educators about 11% more likely to earn less than \$50,000 each year and male educators about 13% more likely to earn more than \$70,000. In contrast, the gender differences in the distribution of annual income in the ACS are striking, with female educators about 35% more likely to earn less than \$50,000 each year compared to male educators and about 40% less likely to earn more than \$70,000 each year.

### 5. Conclusion

This paper examines gender gaps in a setting where direct discrimination for determining the pay for a specific position is likely to play a very small role. In the US, the majority of K-12 educators are women and the compensation for specific positions are largely determined through a set salary schedule based on years of education and degree of advanced education. However, even in this setting, we find very large gender gaps, with the average male educator earning \$12,000 more than the average female educator. Men are more likely to hold an administrative position and to obtain a graduate degree, but even when we control for these two important factors, we still observe a gender gap of \$8000. This gap likely persists due to several non-discriminatory factors including non-salary pay benefits, the sorting of male workers to higher paying districts, male teachers working outside jobs, and differences in work experience due to childbearing of mothers.

The results in this paper indicate that having an administrative position and a graduate degree are two of the strongest predictors of compensation for K-12 educators. These provide two natural mechanisms whereby districts could narrow gender pay gaps. One possibility is to provide a teaching track with the potential for earnings as high as those for an administrative position; in fact, some districts, such as the San Juan District in Utah, are starting to experiment with this type of

**Table 3**  
Gender gaps in pay using public salary databases.

Female	– 4922** (22.03)	– 3256** (20.22)	– 7870** (58.99)	– 4433** (34.23)	– 3256** (50.34)	– 2052** (32.08)
Administrator		43,062** (64.88)		33,633** (102.69)		30,028** (134.99)
Graduate degree				8274** (25.02)		10,455** (31.11)
Teaching experience				1401** (1.80)		
Age						527** (1.58)
N		6,398,488		1,288,527		503,068
Fixed effects		State		District		District
States included		CA, DC, GA, IL, KS, NV, PA, UT, WA, WI		IL		WI

Notes: The outcome is salary measured in 2014 dollars. Each column includes year fixed effects. Observations are at the teacher-year level. Years included for each state are: California, 2012–2014; DC, 2014–2016; Georgia, 2010–2015; Illinois, 2005–2012; Kansas, 2008–2015; Nevada, 2009–2015; Pennsylvania, 2010–2015; Utah, 2015; Washington, 2005–2015; and Wisconsin, 2010–2014. Each specification has controls for the grade the teacher teaches. Robust standard errors in parentheses.

\*\*  $p < 0.01$ , \*  $p < 0.05$ .

approach. Another option is to provide smaller pay increases for educators who have a graduate degree. This would be a particularly beneficial policy change, as seeking a graduate degree can impose a considerable cost on educators and has been shown to have a minimal causal impact on teacher effectiveness (Goldhaber & Brewer, 1997; Clotfelter, Ladd, & Vigdor 2010).

Our results also indicate two ways that data can be analyzed to show a much smaller gender gap in educator compensation. First, using ACS data and restricting the sample to younger educators (under 35) without any children, we find a much smaller gender pay gap, with a raw gap about four times smaller for this group than for the full sample. This result is in the spirit of previous studies which show that child-bearing is an important contributor to gender pay gaps and that these gaps widen over time (Kunze, 2000). Second, we find that male and female educators have a very similar pay distribution when we focus just on public salaries. It is only when we use annual income measures from the ACS that large gender differences in income distribution arise. When focusing on total annual income, we find that female educators are about 35% more likely to earn less than \$50,000 each year compared to male educators and about 40% less likely to earn more than \$70,000 each year.

Finally, our results highlight the importance of using both survey and administrative data to examine gender gaps in compensation. Using only administrative salary data may result in estimates of gender pay gaps that are smaller because they may not include other sources of compensation. Using survey data on annual income may result in larger estimated gender pay gaps because the response to questions about income may include income from multiple sources, and male educators may be more likely to seek out additional employment. Future research on gender pay gaps will likely benefit from combining insights from both administrative and survey data.

### Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.econedurev.2018.11.004.

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