University of Waterloo

Econometrics

Econ 321

Are Teachers in Ontario overpaid?

---

1 Introduction

The much-too-common notion of Ontario teachers being overpaid, compared to teachers from other provinces and countries, has resulted in a drastic change in school curriculums throughout Ontario. Recently, a wage freeze bill for teachers passed in the Ontario legislature, consequently affecting extracurricular activities that children enjoy. The unions representing elementary and secondary school teachers are requesting teachers to withdraw from many voluntary activities, such as coaching, as a means of protest against the bill. This raises an important question: are teachers in Ontario overpaid? Empirical evidence is essential and important in the analysis of this question, as knowing the answer to this question helps in determining the appropriate action that may need to be taken towards this passed bill. Are teachers overpaid, underpaid or deserve exactly what they are currently paid? Undoubtedly, lack of participation by teachers in extracurricular activities has a drastic effect; it limits schools from providing the necessary well-rounded development for students. In fact, this may have a social effect on the upbringing of students. The answer to this question will help shape a better future for the adults of tomorrow.

2 Data

The data was collected from a survey called Economics 321 in November 2012. A few approaches were taken in order to collect the data like going to local elementary and secondary schools, approaching in person/ emailing full time employees in different public sectors, and sending out surveys through social media like Facebook and LinkedIn throughout Ontario. This non-aggregated data includes information like the gender, whether or not they are teachers, their income per month, hours worked per week, their education, duration of their present job and the number of years they have been in the work force. Other variables like whether or not they got paid time off was dropped since it did not have any effects on the desired issue. Some samples that were outliers were dropped since they influenced the data in a biased manner. Also the samples with no income reported were dropped. The benefit of collecting the data by conducting a survey is that the individuals who responsed as being teachers are indeed teachers from elementary and secondary schools, and not at a college or university level. It helps in evaluating a more accurate result as data generated from data banks can have biased data since they are not too specific about which kind of teacher an individual is. It in fact, will have a dramatic biased effect since the wage of teachers and post secondary educators has a huge gap in income.

3 Methodology

There are several models that can be considered to determine the results. The first model is:

$$lwage = \beta_0 + \beta_1 teacher + \mu \tag{1}$$

where teacher is the coefficient of interest which indicates 1 if the person is a teacher and 0 otherwise. It indicates how much of an affect being a teacher has on the log wage. The log wage is the dependent variable. β_0 is a constant and μ is the error term consisting of other unobserved factors that affect the hourly wage. From this model we can determine the mean difference between the teachers and the non teachers.

Although the first model gives a general idea of the results, it can be assumed that the log wage is not only dependent on whether an individual is a teacher or a non teacher. The log wage also depends on whether an individual is a male or a female, their education, number of years worked at the current job, and number of years in the work force. The models below account for the above variables in addition to previous variable and then the final model evaluates the effect of all the variables on log wage of an individual.

The other models that will be considered are:

$$lwage = \beta_0 + \beta_1 teacher + \beta_2 educ + \mu \tag{2}$$

$$lwage = \beta_0 + \beta_1 teacher + \beta_2 educ + \beta_3 male + \mu \tag{3}$$

$$lwage = \beta_0 + \beta_1 teacher + \beta_2 educ + \beta_3 male + \beta_4 jobexper + \mu \tag{4}$$

But the main model which will be used in analyzing results is as follows:

$$lwage = \beta_0 + \beta_1 teacher + \beta_2 educ + \beta_3 male + \beta_4 jobexper + \beta_5 wrkforce + \mu \tag{5}$$

4 Results

Table 1: Regression of models (1) and (5)

Dependent Variable:lwage		
Independent Variables	(1)	(2)
Teacher	0.3362 (0.2681)	0.1414 (0.2898)
Years of Education	–	0.02656 (0.05063)
Gender	–	-0.004613 (0.2845)
Years in current job	–	0.03741 (0.02440)
Years in work force	–	0.009628 (0.01938)
intercept	3.1327 (0.1632)	2.3774 (0.8291)
Observations	27	27
R-squared	0.0592	0.3645

Note:
Values represent coefficients of the indepedent variables Number in parenthesis represent the standard error

According to the regression of lwage on teacher, the following is produced,

$$lwage = 3.1327 + 0.3362teacher,$$

which suggests that being a teacher has a positive impact on lwage of an individual. If an individual is not a teacher, their log wage is 3.1327, but the log wage of an individual who is a teacher is 3.1327 + 0.3362, which is 3.4689. The resulting difference between the two is of 33% The same can

be seen if you evaluate the difference between the mean of both the teacher and non-teacher. 3.4689 - 3.1327 = 0.3362, giving a percentage difference of 33% Using a hypothesis test, it can be determined whether or not the earnings are statistically significant. The hypothesis testing is as follows:

$$H_0 : \beta_1 = 0$$
$$H_1 : \beta_1 \neq 0$$

The null hypothesis predicts that there is no log wage difference between an individual who is a teacher and an individual who is not a teacher. At the 5% significance level, the t-stat is 1.25 and the P-value is 0.222, and since the t-stat >P-value, we can reject the null hypothesis at the 5% significance level. Therefore it can be concluded that the variable, teacher is statistically significant at the 5% significance level.

The R-squared value measures the proportion of variability in the dependent variable that can be explained by the regressors in the model. the R-squared value in model (1) is 0.0592, which means that the variable teacher only explains 6% of the variation in the model. This value is fairly low, which means that being a teacher does not have a very strong effect on the log wage of an individual.
In the models, (2), (3), and (4) the effect of being a teacher on the log wages slowly decreases and the R-sqaured value increases, which proves that other factors affect the logwages of an individual and explain the model better.

In the final model (5), more independent variables are added. After the regression in (5), it can be seen that every independent factor has a postive effect on the logwages, except the gender. The negative impact of being a male is in effect only after the work force independent variable is added to the model. There can be many reasons as to why it is so, one being that males who have been in the work force for a long period of time are much older and can not find jobs that pay them as well as they earned in the earlier years of their employment.
Now the effect of being a teacher is much smaller than it was in model (1) as now we get the equation as follows:

$$lwage = 2.3774 + 0.1414teacher + 0.0266educ - 0.0046male$$
$$+0.0374jobexper + 0.0096wrkforce$$

After analyzing the above equation, it can be seen that after factoring out the possibility of an individual having the same education, gender, job experience at the current job and same number of years in the work force, they will have a 14% difference in the lwages if they are a teacher.

Using a similar process as above, the null hypothesis is

$$H_0 : \beta_1 = 0$$
$$H_1 : \beta_1 \neq 0$$

predicting that being a teacher has no effect on the log wages of an individ-

ual. At the 5% significance level, the t-stat is 0.49 and the P-value is 0.631, and since the t-stat $<$ P-value, we fail to reject the null hypothesis at the 5% siginificance level. This result is different from the one we concluded after analyzing model (1) because other factors that influence the log wage are taken into consideration.

The R-squared value for this regression is 0.3645, which means the new independent variables added have more effect on the independent variable and explains 36% of the model. It still is not very high, but it better compared to model (1). It also means there are other factors that influence the wage of an individual that are not included in model (5).

5 Conclusion

At first, in model (1) it appeared that being a teacher has a positive effect on an individual since the model consisted of only teachers and non-teachers. Gradually when more factors were added to the model, the effect of being a teaher started decreasing. Even though model (5) is not statistically significant at the 5% confidence level, it suggests that being a teacher has a positive effect on the log wage of an individual, even if it is a tiny effect. Therefore if other people who are similar in aspect to other independent variables except being a teacher, they are paid less. In other words teachers are overpaid and Bill 115 seems to be justified since they are cutting back wages for the teachers only to benefit the students by investing in projects like full day kindergarten and smaller classroom sizes to enhance the experience of students, which in turn will be better for society as a whole.