Senior Project

Department of Economics

"Corporate Taxation's Effect on Earnings"

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Abstract

With the recent changes in government policy on Corporate Taxation this study looks at the effect changes in corporate tax rates have on earnings of individuals taking into account what industries and states they live in. Using data gathered from the American Community Survey and the NYU database provided by Aswath Damodaran it made it possible to run a Two-Way Fixed effect model to study the effect changes in the corporate tax rate have on earnings. All data used for this study accounts for the year of 2010. After running a Two-Way model the results were inconclusive either due to industries having bargaining power with the federal government to lower their tax rate. Also it can be concluded that corporations give out bonuses when they receive a discounted tax rate. By using earnings instead of a wage rate this study is more effective measure of capturing bonuses and benefits given by firms than previous studies.

Corporate Taxation and its effect on Earnings

I.   Introduction

With the most recent changes in the United States corporate tax structure the question arises what will be the effects these changes might have on wages. Following the announcement of lowering the corporate tax rate, Walmart announced it will raise its minimum wage from $9 to $11. Walmart not being the only one to offer incentives since the tax cut. The J.M. Smucker Company has offered a 1 time 1000 dollar bonus to its employees.   Recent studies on corporate tax rates have found that higher corporate tax rates result in lower wages (Felix. 2009). Higher taxes lower profits which pushes firms to lower wages. The United States up until recently has had a corporate tax rate of 35% now being lowered to 21% by the new tax plan. However, the actual rate that corporations pay is much lower than 35% which is the effective corporate tax rate. The effective rate is what the company actually pays to the government federal government and is different across industries.

By studying the effective rate and it effect on earnings it will be a proper measure of estimating if corporate taxation is an effective measure of relieving the burden of taxation from the worker and placing it on the firm. Corporate taxation has been in practice since the 1950's. Now roughly all OECD countries have some form of corporate taxation averaging around 23-25%. For this reason it is important to compare the work in this study to other that have focused on countries such as Germany to see similarities on how corporate taxation effects their workforce and ours. By using earnings instead of a wage rate like previous studies have done in the past the work in this model can account for bonuses that corporations give out instead of

wage rate changes. Companies like Smucker's gave out bonuses instead of changing their wage

rate for employees so this study will provide a better estimate than ones done by Fuest and Felix.

II.   Existing Literature

Existing literature regarding the effect of corporate taxes on wages hypothesizes   that

with increases in the tax rate workers will experience a reduction in wage. Studies have been

done at the state and federal level with a numerous methods such as panel data sets or pseudo

panel sets.[1] The assumption of an inverse relationship between taxes and wages is stated in every

study, because with higher taxes there is less revenue to be shared among workers. One study has

shown that for a 10% increase in the corporate tax rate there will be a decrease of about 7% in

the annual gross wages (Felix 1970). Using state level data, a more recent study has shown that

for every 1% increase in the state corporate tax rate there is a reduction of about .27% in wages

(Felix 2009).

One of the main purposes of the corporate tax is that they are supposed to take of the

financial burden from the worker and put onto the firm. In the studies done by Fuest he finds that

workers bear almost half of the tax burden. Using a 20-year panel data set of German

municipalities that have a corporate status along with a local governments, Fuest (2016)

identifies over 6800 tax changes and uses a difference-indifference model to link employer-

employee data to create an estimate on the causal effect of corporate taxes on wage. His findings

found that workers share approximately 51% of the tax burden.

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[1] Pseudo panel is an alternative to panel data for estimating fixed effects when there is only one
independent or repeated cross-sectional data available

A second study uses a pseudo-panel set from 1998 to 2006 for Germany to estimate how the burden of a corporate tax is shared between workers and employers (Dwenger, 2011). The OLS model was found to be inconclusive because it did showed that taxes have a positive relationship on wages. This results was probably due to the fact that OLS does not account for the group fixed effects. To overcome this limitation she created a pseudo-panel data set by pairing cross-sectional tax returns and labor information along with labor market observations by industry and region of the 16 federal German regions (Dwenger 2011). The results concluded that a cut in corporate taxes by 1 Euro would result in an increase of the wage by almost .47 Euros (Dwenger 2011). Dwenger stated that according to theoretical theory this was an over estimation of the impact of corporate taxes on the labor force.

Also using state level data, Felix (year) used an OLS regression to see what the effect an increase in corporate taxes would have on wages. By using state level variables such as the average tax rate and individual characteristics of workers in selected states, Felix found conclusive evidence that educational attainment and mobility are associated with higher wages. For example the level of public goods and services available. The regression model found that for every 1% increase in state corporate taxes the wage rate decreased by .27%.

In 2006 a similar study was done to estimate the effects of corporate taxes on wages in the manufacturing sector. Using data for 65 countries from the period 1981 to 2005, Hassett and Mathur run a model of the five-year average hourly wage controlling for variable such as the top corporate tax rate, the value added of workers (deflated by the Consumer Price Index),the level of education, and the extent of labor market regulations in each country. This study finds that with a 1% increase in corporate tax rates there is a .3% decrease in wage rates which is in line with the results in Felix (2009).

By looking at the previous literature all of the studies have shown that corporate tax rates have a negative effect on wages. One of the main purposes of lowering a corporate tax rate is to alleviate the burden of a tax on the worker. Among labor forces with different skill levels, individuals with higher levels of education are found to bear an even larger burden (Felix 2009). By looking at the previous research it is possible to dive into a new study of what the effect the new corporate tax rate will have on the wage rate of workers by industry.

III.   Theoretical Model

The theoretical hypothesis on the effect corporate taxation will have on wages is based on previous literature. With a reduction in the corporate tax rate there will be an increase in demand for labor, because the decrease in the after tax profit will induce firm to produce more. The increase in the demand for labor will lead to an increase in wage. The magnitude of this increase in wages is the incidence of corporate taxation on labor demand. The empirical model will consist of the estimation of the effect of effective corporate tax rate by industry on workers' wages. The average effective rate shows the actual rate at which corporations pay taxes compared to the flat 35% tax rate established by the federal government. Based on theory it can be assumed that the effective rate along with any other tax variable will have a negative relationship with earnings.

IV, Methodology and data

Looking at previous literature one of the main factors for determining earnings is the level of educational attainment received by an individual. The higher level of education should result in a higher wage rate having a positive relationship. The gender of the individual either male or female. Studies have shown that males on average earn more than females in the work

force which is an important factor to include in the data set. Along with gender, age is relevant, which could help determine the amount of work experience that they have. Someone who is 18 years of age will have less real world experience than someone who is 40. The race of someone can also play a part in earnings. Again studies have shown that white males earn on average more than black males in the United States. There are still other variables that need to be included in this model that I do not yet have such as what state the individual lives in. This would help determine wage based on geographical location. Someone in New York earns on average more than someone in New Mexico to adjust for the higher costs of living and prices.

The Effective tax rate data will be pulled from a data set created by Aswath Damodaran an NYU professor that has open access to data from Bloomberg, Morningstar, Capital IQ and Compustat to gather the effective tax rate across all industries in the United States. Aside from the effective tax rate all of the other variables will be pulled from the American Community Survey. At the individual level for over 172322 from 481,341 people in 80 separate industries. Only 172322 will be observed in the model because data is only available with what industry and state those individuals worked in.

$$(IncEarn_{ij}) = Effect\_Rate_{ij} + Educ_{ij} + Race_{ij} + Age_{ij} + Gender_{ij} + \varepsilon$$

Figure 1

Variable	N	Mean	Min	Max
InEarn	367201	58263	15080	1008000
LessHS	367201	0.06247	0	1
HS	367201	0.2914	0	1
SomeCollege	367201	0.2521	0	1
More College	367201	0.1509	0	1
Black	367201	0.08827	0	1
OtherRace	367201	0.15947	0	1
Age	367201	44.44	18	65
Female	367201	0.4471	0	1
Effect Rate	172322	14.809	1	35

http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/taxrate.htm

Looking at the figure above we can see the means procedure for all of the variables that will be used in the model. **IncEarn** represents the amount of earnings for an individual per year. The average being $58,263 per year, the minimum amount accepted was $15,080 per year which represents someone working full time or 40 hours per week on the federal minimum wage rate. The next set of variables being different levels of education. Starting with **LessHS** which states if an individual has received less than a High School education or not. The next being High School, Some college, and more than a college education. Individuals who have completed a college degree will be left out of the estimate as a reference group for the model. The minimum

being 0 means the individual did not complete the level of education and the 1 means the individual did complete that level of education. Education will be used as an estimate for determining a person's earnings. With additional years of education it can generally be expected that the person has a higher value and earns a greater salary.

The next set of variables that are going to be used in future estimates are variables accounting for race, age, and gender. Looking at the graph individuals who are Caucasian or white are left out and used as a reference group. Individuals who are Black are represented as a 0 or a 1, 0 being they are not black and 1 being they are. The next variable being any other race which will account for all individuals who are neither black nor white for this study. Age will be used as an estimate for experience in estimating for a level of experience for an individual. The minimum being 18 due to anyone younger than 18 will not be considered a full time employee receiving benefits. With additional years in age it can be expected that the individual gains experience and increases their salary. Finally Effective Rate being the most important variable in this group which represents the average tax rate a certain industry pays to the federal government. The average being 14% far below the government established 35%. The next step will be to run a standard OLS regression, One-Way Fixed Effect and a Two-Way Fixed Effect model.

IV.   Results

Figure 2

	OLS		Fix-One		Fix-Two	
	Parameter	T-Value	Parameter	T-Value	Parameter	T-Value
Intercept	42465	71.1	38423	2.37	52113	3.21
Effective Tax Rate	815.46	43.11	276.225	0.51	317.9	0.59
Less than HS	-41998	66.36	-35146	-55.23	-35572	-56.04
High School	-31478	-90.44	-28388	-80.71	-28075	-80.03
Some College	-23392	-65.73	-22003	-62.69	-21904	-62.58
More than College Educ	23886	62.36	27368	72.22	26950	71.3
Female	-22010	-87.78	-20134	-76.23	-20055	-76.2
Age	638.209	63.62	630.15	63.86	629.89	63.99
Black	-7714.62	-17.26	-7030.33	-16.16	-6471.97	-14.58
Other Race	-4464.48	-12.7	-4765	-13.92	-6914.41	-19.19
Industry	No		Yes		Yes	
State	No		No		Yes	
Adj R-Squared	0.1925		0.2415		0.2469	
Root MSE	51653		50061		49882	
F-Value	4564.95		1016.91		831.8	
Number of Observations	172322		172322		172322	

Looking above at **Figure 2** we can see the results for the 3 separate types of estimations used to study the effect corporate taxation has on earnings. The first being the standard OLS regression model with no fixed effect method put in place to account for what industry or state the individuals work in. We can see a high significance level with all variables involved in the model by looking at the T-Values. The reason being for the insanely high T-Values is due to the number of observations used in the model. With 172322 observations used there was an extremely high number of individuals looked at. When interpreting the different levels of education all variables are in reference to someone who has completed a 4 year degree. For example someone who has not completed will receive $41,998 dollars less than someone who has a degree. Someone who has completed more than a college degree will receive $23,886 more than a college grad.

Gender and race both have a negative effect on earnings represented in this model, and age having a positive effect. The most important variable in the model obviously being the Effective Tax Rate which is statistically significant in the OLS model. In order to interpret we can see that a 1% change in the effective rate there is a change of $815.46 to earnings for individuals. By looking at the OLS regression all signs and T-Values are extremely significant. Unfortunately this model cannot be used as the final results in this study. In order to estimate properly we must take into account the industry and the state at which these individuals work.

In the next regression model being a One-Way Fixed Effect model for industry. We can see by running a One-Way fixed effect the effective tax rate becomes statistically insignificant with a T-Value of .59. In comparison to the T-Value of 43.11 in the OLS Regression. All of the other variables used in the model remain their respective signs and high significance. Then in our final Two-Way Fixed Effect model by incorporating the State with our industries, effective tax

rate remains insignificant while all respective signs and variables remain significances remain high.

V.   Conclusions & Limitations

Looking at the results of this study we can see that by changing our model from an OLS regression model to a Two-Way Fixed Effect model the Effective Tax Rate becomes statistically insignificant. There are a number of conclusions to explain for this change. The first being that with a significant change in earnings corporations might be more prone to give out bonuses to their workforce. For example Walmart along with the J.M. Smucker Company gave bonuses up to 1000 dollars to their employees following policy change. Unfortunately in 2010 the only year captured in this study there were no changes in policy to illustrate this change. In the future if this study were to capture multiple years which had policy change in place it would be better suited to illustrate the changes corporations made in their pay structure.

It is also important that earnings remain the dependent variable in this study to account for bonuses, if changes in pay were to be studied the dependent variable would need to be changed to the wage rate for each individual. Unfortunately due to data limitations this was not possible to calculate because there was no variable for amount of hours worked per year to create a wage rate variable. Other variables that would have been beneficial to this study would have been if we knew whether or not the individual was in a workers union or not. Other studies done by Felix have this information. Union workers have a greater bargaining power with their firms to increase their earnings or benefits in comparison to non-union workers. With limitations in time constraints and data availability this study was unable to make these changes. In the future using years such as 2017 to 2018 during a major tax reform this study would give a better estimate on the effect corporate tax rates have on earnings. From there policy recommendations

can be made and we will be able to see the true effect it has on the overall welfare of the

workforce. Overall this study is a good foundation for looking at the effect corporate taxation has

on earnings. If more data is available in a given time span there could be a significant

relationship between the two.

Works Cited

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Effective Tax Rate by Industry-
http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/taxrate.htm

Appendix

SAS Code

```
proc sort data=effect;
by ID;
run;
proc sort data=wage;
by id;
run;
data Combine;
merge Wage Effect ;
by ID;
effect_rate=effective*100;
if statefip=99 then delete;
if statefip=72 then delete;
if statefip=97 then delete;
if statefip=68 then delete;
if statefip=67 then delete;
if statefip=66 then delete;
if statefip=65 then delete;
if statefip=64 then delete;
if statefip=63 then delete;
if statefip=62 then delete;
if statefip=61 then delete;
if incearn<15080 then delete;
if incearn=0 then delete;
if incearn<0 then delete;
lnInc=Log(incearn);
if educ<6 then LessHS=1;
else LessHS=0;
if educ=6 then HS=1;
else HS=0;
if educ=7 | educ=8 | educ=9 then SomeCollege=1;
else SomeCollege=0;
if educ=10 then College=1;
else College=0;
if educ>10 then MoreCollege=1;
else Morecollege=0;
if Race=1 then White=1;
else White=0;
if Race=2 then Black=1;
else Black=0;
if Race>2 then OtherRace=1;
else OtherRace=0;
if sex=2 then Female=1;
else Female=0;
if age<18 then delete;
if statefip=55 then s1=1;
else s1=0;
if statefip=56 then s2=1;
else s2=0;
if statefip=01 then s3=1;
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if id=578 then Ind45=1;
else ind45=0;
if id=647 then Ind46=1;
else ind46=0;
if id=429 then Ind47=1;
else ind47=0;
if id=526 then Ind48=1;
else ind48=0;
if id=596 then Ind49=1;
else ind49=0;
proc means;
var incearn effect_rate lesshs hs somecollege morecollege female age otherrace;
run;
Proc reg;
Model incearn= effect_rate lesshs hs somecollege morecollege female age black otherrace ind1
ind2 ind3 ind4 ind5 ind6 ind7 ind8 ind9 ind10 ind11 ind12 ind13 ind14 ind15 ind16 ind17 ind18
ind19 ind20 ind21 ind22 ind23 ind24 ind25 ind26 ind27 ind28 ind29 ind30 ind31 ind32 ind33
ind34 ind36 ind38 ind39 ind40  ind42 ind43 ind44 ind45 ind47 ind48 ind49 s3 s4 s5 s6 s7 s8 s9
s10 s11 s12 s13 s14 s15 s16;
run;
Proc reg;
Model lninc= effect_rate lesshs hs somecollege morecollege female age black otherrace ind1
ind2 ind3 ind4 ind5 ind6 ind7 ind8 ind9 ind10 ind11 ind12 ind13 ind14 ind15 ind16 ind17 ind18
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```
ind19 ind20 ind21 ind22 ind23 ind24 ind25 ind26 ind27 ind28 ind29 ind30 ind31 ind32 ind33
ind34 ind36 ind38 ind39 ind40  ind42 ind43 ind44 ind45 ind47 ind48 ind49 s3 s4 s5 s6 s7 s8 s9
s10 s11 s12 s13 s14 s15 s16;
run;
```