

Alaric Hunziker

Professor Schneider

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The Effect of the Capital Gains Tax on Median Income

Abstract

This study determines whether there is a relationship between median income and a state's capital gains tax through a regression model. The independent variable is the state's capital gains tax rate alongside other explanatory variables while the explained variable will be median income. All the information for the regression comes from the 50 states alongside Washington D.C. The p-value for capital gains tax was insignificant, $p\text{-value} > 0.1$, but the regression results show that for an increase in the capital gains tax rate by 1%, wage decreases by \$448.46. Even though the capital gains tax rates were found to be insignificant, the most significant variable in determining median income is college education, $p\text{-value} < 0.01$. Using this information, federal and state governments should make additional investments for university level education.

Introduction

A capital gain is a monetary idea characterized as the increase in value of an asset over a holding period. An asset includes property, precious metals, real estate, businesses, stocks, bonds, etc. A capital gain is realized when the selling cost of the asset is larger than the initial price. A capital loss occurs if the selling value is below the initial value. A capital gains tax is a

tax on the profit earned from the selling of an asset which has increased in value. Capital gains are frequently taxed, and the tax rates are often different within the 50 states. The idea of capital gains is related to other key monetary ideas such as rate of return and profit. Capital gains are unique because individuals, not just organizations, can accumulate capital gains through regular obtaining and selling of assets.

There has been an ongoing debate amongst economic scholars and politicians about the rates which capital gains should be taxed. Many believe that capital gains should be taxed at lower rates than income, because the tax does not account for inflation, is a double tax, and decreases the amount of money available to businesses. Many economists do not want any profit earned from capital gains to be eaten away through taxation and inflation. Furthermore, they also argue that since money spent on capital gains is already taxed as income once, a capital gains tax only taxes the same pot of money twice. Finally, the tax would decrease the amount of money spent on investment. However, there is a large group of experts who believe capital gains should be taxed at a higher rate. They argue that capital gains primarily benefit the wealthiest Americans and that an increase in the capital gains tax would lead to a decrease in wealth inequality. Both sides make strong points in whether the tax rates should be increased or decreased, but it has yet to be seen whether the rates make a significant impact on the average American household income.

The hypothesis seeks to measure the effect the top marginal capital gains tax rate has on the average household income per state. To not have an omitted-variable bias, there are going to be several independent variables alongside the capital gains tax rate. The literature reviewed makes some important arguments about whether the taxation of investment income is detrimental or neutral to the growth of an economy. However, there is relatively little said about whether

decreasing the capital gains tax will help lead to no change or an increase in incomes for the average American. If the empirical model does result in there being a link between median income and the capital gains tax rate, then states should try to decrease their tax rates if it does not affect other significant variables used in the regression model. This would lead to an increase in wealth for the average American and should lead to an increase in the GDP of states that make this change.

The significance of the variables in the regression model should show whether the capital gains tax rate is an important determining factor in median income. If the p-value for the tax rate is insignificant then the model will show that there is a minimal link between the tax rate and income.

Literature Review

In Gerald Auten's paper, "Cutting Capital Gains Taxes" Auten looked at both arguments for taxing capital gains as ordinary income and for capital gains receiving special tax treatment instead. In the first argument, opponents of decreasing the capital gains tax believe that lowering the tax rate would only encourage people to switch income from other sources to capital gains thereby not resulting in any net income gains. In the second argument, supporters of decreasing the capital gains tax believe that the lower tax rate will encourage more people to invest and save in riskier small startups that have the potential more growth later. Auten's research ends by suggesting that more research needs to be conducted to see if the tax rate on capital gains results in an overall increase in income and GDP (Auten 10).

In Leonard Burman's paper, "Capital Gains Tax Rates, Stock Markets, and Growth" Burman looks at the affect the capital gains tax rate has on the returns of the stock market. The

author uses the S&P 500 as an index of the growth of the American stock market and more broadly the US economy. Burman looks at two significant bills that decreased and increased the capital gains tax respectively to measure the effect on the growth of the economy: The Jobs and Growth Tax Relief Reconciliation Act of 2003 and the 1986 Tax Reform Act. Even when capital gains taxes were reduced in 2003, the GDP per capita and median income for Americans did not increase. Furthermore, average income did not decrease either in 1986 when capital gains taxes were increased. Burman concludes his research by stating that the capital gains tax rate has a minimal effect on the growth of income (Burman 1).

In Andrew Meyer's paper "Should We Ax the Capital Gains Tax?" Meyer discusses the two sides of supporting and opposing a decrease in the tax rate on capital gains. For those supporting a decrease the primary argument has been a lower tax rate will better account for gains lost to inflation and a lower rate will enable people to move around capital more easily. For those supporting an increase, the reasoning used has to do with who benefits from a decrease in the tax rate. Wealthier individuals make a lot more of their money from capital compared to those of a lower socio-economic class, so a decrease in the capital gains tax will not result in an increase in the average income. The paper ends by suggesting there may be some growth in the overall economy due to a reduction in the tax rate, but average income will not rise (Meyer 1).

In Natasha Sarin's paper, "Rethinking How We Score Capital Gains Tax Reform" and Owen Zidar's paper, "The Tax Elasticity of Capital Gains and Revenue-Maximizing Rates" both authors believe increasing the capital gains tax rate will not negatively impact incomes in the US. They make the argument that a higher capital gains rate may be beneficial to the economy, because of the increased government revenue (Sarin 1). Furthermore, both authors believe an

ideal capital gains tax rate should be in the range of 38% - 47% compared to the highest federal tax rate of 23.8% currently (Zidar 1).

Previous literature shows that there is no consensus in whether the capital gains tax has a significant effect on wages in a state. Leonard Burman suggests there is no correlation between the tax and income. Auten and Meyer believed a lower tax would result in higher incomes while Sarin and Zidar believed higher taxes would result in growth for the economy but no increase in income.

Empirical Model

This paper is going to analyze the correlation between the top capital gains tax rate and the median income per state using the linear regression model:

MedianIncome

$$\begin{aligned}
 &= \alpha + \beta_1 \text{CapitalGainsTax} + \beta_2 \text{Bachelor'sDegree} + \beta_3 \text{MinWage} \\
 &+ \beta_4 \text{Region} + \beta_5 \text{Black} + \beta_6 \text{Hispanic} + \beta_7 \text{Asian} + \beta_8 \text{Other} \\
 &+ \beta_9 \text{GDPGrowth}
 \end{aligned}$$

The dependent variable is the median household income of each state in US dollars.

The independent variables are the top capital gains tax rate, education level, minimum wage, geographic region, race/ethnic data of each state, and the GDP growth rate in 2021. The education level is measured as a percentage of people in a state with at least a bachelor's degree. The minimum wage is the lowest salary a person can earn in a state and if a state does not have a minimum wage law, then the federal minimum wage of \$7.25/hour is used. The geographic region is subdivided into the west, Midwest, northeast, with the exclusion of the south. Racial and ethnic data is measured as a percentage of each state's population which includes black,

Hispanic, Asian, other (Native American, multiracial, or Pacific Islander), but excludes white.

The GDP growth rate is calculated as a percentage increase of a state's GDP in the fourth quarter of 2021.

Data

The top marginal capital gains tax rate is the highest rate someone will have to pay for capital gains in a certain state including both federal and state taxes. This data comes from the Tax Foundation's [Capital Gains State Tax Map](#). This information has been collected through calculations done through the Tax Foundation and state statutes. The median income is the median income a household in a state makes per year. This data was collected from the Federal Reserve Bank of St. Louis' report on [Household Income by State, Annual](#). Data on education was collected through US Census Bureau's report on [Educational Attainment](#). Household income data and education information were both collected through the 2020 census. Information about a state's minimum wage comes from [US Department of Labor](#). The states are categorized into the following four regions: west, Midwest, northeast, and south. Racial and ethnic data comes from the Kaiser Family Foundation's report [Population Distribution by Race/Ethnicity](#). GDP growth rate comes from [US Bureau of Economic Analysis](#).

The table below (Table 1) shows the descriptive statistics of the variables used in this regression model.

Table 1. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
mediana~2020	51	68310	11756.34	44966	94384
topcapital~e	51	29.00588	3.119706	23.8	37.1
bachelorsd~r	51	32.70627	6.536088	21.05	59.67
minimumwage	51	9.785882	2.571145	7.25	15.2
west	51	.254902	.4401426	0	1
midwest	51	.2352941	.4284033	0	1
northeast	51	.1960784	.4009792	0	1
south	51	.3333333	.4760952	0	1
black	51	11.10392	10.46008	.6	45
hispanic	51	12.00784	10.58075	.6	49.5
asian	51	4.337255	5.705014	.8	39.4
other	51	4.854902	5.157221	1.8	28.7
white	51	67.68039	16.38826	20.4	93.2
gdpgrowth~e	51	5.703922	2.767812	-2.3	10.1

Although the minimum and maximum values of the capital gains tax vary greatly, the standard deviation of 3.12% is quite small suggesting that the average capital gains tax does not differ widely from each state. The capital gains tax rate ranges from 23.8% in Alaska, Florida, Nevada, South Dakota, Tennessee, Texas, and Wyoming to 37.1% in California, with the average being 29.01%. The standard deviation of the minimum wage is 2.57 which means the minimum wage does not deviate much from the average minimum wage of \$9.79.

The average median income is \$68,310 with the minimum being \$44,966 in Mississippi and the maximum being \$94,384 in Maryland. The standard deviation of median income is \$11,756.34 suggesting that the state which a person lives in affects their income greatly. Furthermore, the average percentage of a state with at least a bachelor's degree is 32.71% with a minimum of 29.05% in West Virginia and 59.67% in Washington D.C. The standard deviation is 6.54% which means that educational attainment levels vary widely by state. The mean GDP

growth rate is 5.70% with a standard deviation of 2.77%. The minimum growth occurred in Iowa where the economy shrank by -2.3% and the maximum growth occurred in Texas with 10.1%.

Empirical Results

There is minimal correlation between the capital gains tax rate and the median income. When the capital gains tax rate increases by 1%, the median income decreases by \$448.46. However, the regression results in table 2 show that the capital gains tax rate is not an important determining factor of median income ($0.198 > 0.1$, not significant).

Table 2. Regression Results

Source	SS	df	MS	Number of obs	=	51
Model	5.3554e+09	11	486857813	F(11, 39)	=	12.21
Residual	1.5551e+09	39	39875330.8	Prob > F	=	0.0000
				R-squared	=	0.7750
				Adj R-squared	=	0.7115
Total	6.9106e+09	50	138211477	Root MSE	=	6314.7

medianannualincome2020	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
topcapitalgainsrate	-448.455	342.304	-1.31	0.198	-1140.83	243.9202
bachelorsdegreeorhigher	1527.143	188.0175	8.12	0.000	1146.842	1907.444
minimumwage	-246.4486	500.1601	-0.49	0.625	-1258.118	765.2208
west	1745.854	3173.672	0.55	0.585	-4673.505	8165.212
midwest	546.2583	3404.464	0.16	0.873	-6339.919	7432.436
northeast	-7.387826	3233.778	-0.00	0.998	-6548.322	6533.546
black	-289.43	131.0432	-2.21	0.033	-554.4899	-24.37014
hispanic	-53.20533	106.8469	-0.50	0.621	-269.3236	162.9129
asian	680.0246	232.5673	2.92	0.006	209.6129	1150.436
other	-448.0155	285.9422	-1.57	0.125	-1026.388	130.3571
gdpgrowthrate	-274.0224	446.6545	-0.61	0.543	-1177.466	629.4216
_cons	37851.61	10945.33	3.46	0.001	15712.58	59990.63

The following is the regression model using the new coefficients:

MedianIncome

$$\begin{aligned}
&= 37851.61 - 448.46\textit{CapitalGainsTax} + 1527.14\textit{Bachelor'sDegree} \\
&- 246.45\textit{MinWage} + 1745.85\textit{West} + 546.26\textit{Midwest} - 7.39\textit{Northeast} \\
&- 289.43\textit{Black} - 53.21\textit{Hispanic} + 680.02\textit{Asian} - 448.02\textit{Other} \\
&- 274.02\textit{GDPGrowth}
\end{aligned}$$

When regressing alongside the capital gains tax rate, education and race were the main determining factors of median household income. States with a more college educated population were more likely to see a large increase in median income (p-value is very significant, $0 < 0.01$). States with a larger black population were likely to see a decrease in income (p-value is significant, $0.03 < 0.05$) while states with a larger Asian population were likely to see an increase in income (p-value is very significant, $0.006 < 0.01$).

Geographic region, minimum wage, GDP growth rate, Hispanic, and other did not play a large role in determining median income ($p > 0.1$).

Conclusion and Policy Implications

The empirical results show that the capital gains tax rate in a state is not an important determiner of income in a state. These empirical results and the results of Leonard Burman's study show that there is minimal correlation between the capital gains tax and median income. Gerald Auten's paper and Andrew Meyer's paper suggests that lowering the capital gains tax may increase incomes and while my regression results show that higher capital gains taxes do result in lower median income, the tax variable is insignificant which means it doesn't result in major changes to a person's income. These results are contradictory to the results of Natasha

Sarin's paper and Owen Zidar's paper because both of those papers believe increasing the tax may help the economy.

The results of the empirical study suggest that significant investment in college education programs will do the most to significantly impact a state's income. The federal and state government should spend more money on state universities and colleges, as these institutions lead to a more skilled workforce that can command higher wages. Although this paper was primarily focused on taxation rate and income level, further research should be conducted on the impact of education on income.

The main limitation of the empirical study is year from which the data was collected. Most of the data collected came from the 2020 census or US government reports from 2021 but this information may be dated for a study conducted in 2022. Another limitation of the empirical model is it failed the Breusch-Pagan Test and although a log model would end up passing this test, some of the race/ethnic variables changed in significance.

Additional Tests

Heteroscedasticity: Breusch-Pagan Test (Failed)

(Log Transformation Regression)

Source	SS	df	MS	Number of obs	=	51
Model	1.19668912	11	.10878992	F(11, 39)	=	13.13
Residual	.323095545	39	.008284501	Prob > F	=	0.0000
				R-squared	=	0.7874
				Adj R-squared	=	0.7274
Total	1.51978467	50	.030395693	Root MSE	=	.09102

lnmedianincome	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
topcapitalgainsrate	-.0067156	.0049339	-1.36	0.181	-.0166954	.0032643
bachelorsdegreeorhigher	.0227641	.0027101	8.40	0.000	.0172825	.0282457
minimumwage	-.0053918	.0072093	-0.75	0.459	-.0199739	.0091903
west	.0322979	.0457449	0.71	0.484	-.06023	.1248258
midwest	.027451	.0490715	0.56	0.579	-.0718056	.1267075
northeast	.0081241	.0466113	0.17	0.863	-.0861562	.1024044
black	-.0046683	.0018888	-2.47	0.018	-.0084888	-.0008477
hispanic	-.0006651	.0015401	-0.43	0.668	-.0037802	.00245
asian	.0101549	.0033522	3.03	0.004	.0033744	.0169354
other	-.0067377	.0041215	-1.63	0.110	-.0150743	.0015989
gdpgrowthrate	-.0030846	.006438	-0.48	0.635	-.0161068	.0099375
_cons	10.6699	.1577647	67.63	0.000	10.35079	10.98901

Breuch-Pagan Test with Log Transformation: Passed

Source	SS	df	MS	Number of obs	=	51
Model	.001785716	11	.000162338	F(11, 39)	=	1.57
Residual	.004026475	39	.000103243	Prob > F	=	0.1458
				R-squared	=	0.3072
				Adj R-squared	=	0.1118
Total	.005812191	50	.000116244	Root MSE	=	.01016

esq	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
topcapitalgainsrate	.0000597	.0005508	0.11	0.914	-.0010544	.0011738
bachelorsdegreeorhigher	.0006091	.0003025	2.01	0.051	-2.80e-06	.0012211
minimumwage	.0001952	.0008048	0.24	0.810	-.0014326	.0018231
west	.0007851	.0051067	0.15	0.879	-.0095442	.0111144
midwest	-.0074671	.0054781	-1.36	0.181	-.0185475	.0036133
northeast	-.0032806	.0052034	-0.63	0.532	-.0138055	.0072443
black	.0000106	.0002109	0.05	0.960	-.0004159	.0004371
hispanic	-.0000552	.0001719	-0.32	0.750	-.000403	.0002925
asian	-.0006971	.0003742	-1.86	0.070	-.001454	.0000598
other	.0009258	.0004601	2.01	0.051	-4.80e-06	.0018565
gdpgrowthrate	-.0004606	.0007187	-0.64	0.525	-.0019143	.0009931
_cons	-.013328	.0176119	-0.76	0.454	-.0489515	.0222955

The log model results are similar to the results of the normal regression with college education and Asian having significant p-values ($0.051 < 0.1$ and $0.07 < 0.1$). The other differences between the log model and the normal model are black is no longer a significant variable ($0.96 > 0.1$) while other has become significant ($0.051 < 0.1$).

Normal Residuals: Skewness-Kurtosis All Normality Test

Skewness/Kurtosis tests for Normality					
Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	joint Prob>chi2
myResiduals	51	0.1240	0.0519	5.80	0.0549

Skewness/Kurtosis tests for Normality					
Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	joint Prob>chi2
mediana~2020	51	0.6126	0.1652	2.30	0.3168
topcapital~e	51	0.8826	0.6681	0.21	0.9023
bachelorsd~r	51	0.0003	0.0008	18.51	0.0001
minimumwage	51	0.1725	0.0002	12.80	0.0017
west	51	0.0017	0.1983	9.64	0.0081
midwest	51	0.0007	0.6427	9.81	0.0074
northeast	51	0.0001	0.3536	12.95	0.0015
black	51	0.0003	0.0519	13.34	0.0013
hispanic	51	0.0000	0.0043	19.76	0.0001
asian	51	0.0000	0.0000	59.51	0.0000
other	51	0.0000	0.0000	42.69	0.0000
gdpgrowthr~e	51	0.0024	0.0685	10.39	0.0055

Multicollinearity: Variance Inflation Factor (VIF)

```
. vif
```

Variable	VIF	1/VIF
other	2.73	0.366730
midwest	2.67	0.374914
west	2.45	0.408718
black	2.36	0.424459
asian	2.21	0.453026
northeast	2.11	0.474319
minimumwage	2.07	0.482240
gdpgrowthr~e	1.92	0.521816
bachelorsd~r	1.89	0.528083
hispanic	1.60	0.623990
topcapital~e	1.43	0.699331
Mean VIF	2.13	

Ramsey Test:

```
. ovtest
```

```
Ramsey RESET test using powers of the fitted values of medianannualincome2020
Ho: model has no omitted variables
      F(3, 36) =      2.56
      Prob > F =      0.0698
```

The Heteroscedasticity (Breusch-Pagan) test did not pass, so to remediate this problem I used a log transformation regression which then passed the Breusch-Pagan test. Otherwise, all my other tests passed.

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