CAPITAL GAINS TAXATION AND STOCK MARKET INVESTMENTS: EMPIRICAL EVIDENCE

Akinloye Akindayomi, University of Texas – Pan American

ABSTRACT

The objective of this study is to examine stock market investments responses to changes in capital gains tax rate. A priori, rational taxpayers are expected to respond to changes in this tax rate. For example, a reduction (increase) in capital gains tax rates may make taxpayers to unlock (lock-in) substantial amounts of accrued (realizable) appreciated gains. The findings of this study however reveal that capital gains realization and not capital gains tax rates impacts stock market investments in the U.S.

JEL: M40, M41

KEYWORDS: Stock Market Investment, Capital Gains Tax Rates, Realized Capital Gains

INTRODUCTION

In many countries, including the U.S., the concept of deferral is central to capital gains taxation. That is, capital gains are taxed when 'realized' after sale or exchange of the eligible capital assets. On one hand, Haig-Simons 'pure net accretion' regime demands that capital gains (losses) should be subject to tax (deduction) in the year they accrue thereby requiring taxpayers to estimate realizable value of appreciated taxable assets. This may force taxpayers into untimely and inefficient liquidation of some assets in order to meet ensuing capital gains tax liability and obligations. Undoubtedly, this violates the fairness principles inherent in the U.S. taxation system. On the other hand, the double taxation argument ideally suggests a zero capital gains tax on capital accumulation. In corollary, incomes from capital gains enjoy preferential tax treatments.

Arguably, the preferential treatment of capital gains income (especially of long term character) contradicts tax equity doctrine, which suggests that all income (capital gains or ordinary income) should be taxed at same rates. It becomes pronounced if one considers the tax treatment of the 'carried interest' component of the compensation package of hedge fund managers. In fact, the Congressional Budget Office estimates that the treasury will bring in over $20 billion dollars additional tax revenue between 2012 and 2021 if 'carried interest' is treated as ordinary income and taxed at ordinary income rates (CBO, 2011). No wonder then that the literature on desirability of capital gains tax is at best inconclusive in terms of its desirability and optimum capital gains tax rate level that maximizes economic efficiency.

It is widely believed that high-end taxpayers with long-end holding period and substantially appreciated capital assets have the tax and financial incentive to postpone otherwise efficient realization of capital gains in order to defer capital gains tax liability, and that in some cases avoid it by waiting until death in order to enjoy the step-up basis associated with estate taxation. This is a classical manifestation of the lock-in effect rule (Ivkovich et al., 2004. See also Elton et al., 2010) as this allows for resetting the capital assets' tax bases (including the unrealized capital gains) at death. In addition to potential loss in tax revenue, this rule certainly distorts optimal investments portfolio and diversification strategy as capital could be trapped in inefficient investment outcomes. However, the extent at which investors believe in the ability of current tax rates to predict future tax liability remains an empirical question.

Focusing mainly on capital gains generated through stock market transactions, this study attempts to empirically examine whether, on aggregate, investors/taxpayers fully and truly respond to the interaction between changes in capital gains tax rate and capital assets liquidation in a 'rational' way. *A priori*,

rational taxpayers are expected to respond to changes in this tax rate. For example, a reduction (increase) in capital gains tax rates may make taxpayers to unlock (lock-in) substantial amounts of accrued (realizable) appreciated gains. This study specifically finds that on aggregate, total capital gains realized and not necessarily capital gains rate affect stock market investments in the U.S. It must be noted that Barber and Odean (2000) document that some investors tend to misappropriate the timing of their stock transactions by holding 'to losers too long' and selling 'winners too soon' (see Jin, 2006; Sialm and Starks, 2012), although it is believed when investors get trapped in the former, the locked-in gains effects on overall capital allocation is negligible (CBO, 2002). The remainder of the paper proceeds as follows. The next section reviews the relevant literature in order to motivate the research question and the hypotheses. While section 3 focuses on sample, data and methodology; results are presented and discussed in section 4. Also the findings from additional sensitivity analysis performed and the follow-up discussions are provided in the same section. Chapter 5 concludes the study.

LITERATURE REVIEW

Capital gains tax proceeds are not insignificant part of the tax revenue collected by the U.S. treasury through Internal Revenue Service (IRS). For example, between 2002 and 2007, the percentage of realized capital gains relative to total income continues to increase from 3.67% to slightly over 10%. A major reduction in capital gains is the deductibility of capital losses. However, the tax law imposes constraints on the amount of such losses that individuals can deduct in order to prevent taxpayers from generating artificial losses. This study mainly focuses on capital gains generated through stock market transactions as this is the major source of capital gains in the U.S. (see Moore, 2008; Sikes and Verrecchia, 2012). Analytical and theoretical literature suggest that outside tax considerations, investors will nonetheless accelerate realization of capital gains for liquidity and diversification priorities (see Hong and Stein, 2003; Zeng, 2009). Therefore, to always argue that increasing capital gains tax rate will slow stock market activities is an overstatement especially in view of the findings of Jin (2006) which shows that '…on the average, tax insensitive institution is larger than average tax-sensitive institution'.

In fact, Jin further finds what he called 'counterintuitive' as his data indicates that tax-sensitive institutions are more active in turning over their portfolio even with capital gains rate hikes relative to the tax-insensitive institutions. Since 1913 when capital gains were first taxed at ordinary income tax rates, capital gains tax has witnessed numerous historical metamorphoses both in magnitude (i.e. tax rates) and structurally (for example exclusion of gains). Tax reform Act of 1986 increased the maximum rate to 28% while at the same time repealing the exclusion of long-term gains. Despite the fluctuation in rates, the effect of inflation on capital gains is well documented in the literature. In fact, Auten (1999) argues that lower or middle income taxpayer capital gains over time simply represent nominal gains but 'real economic losses'. Hence the need to focus capital gains taxation on high-end individuals with substantial gains more so that Poterba (1987) notes that statutory capital gains tax rate is substantially higher than the true capital gains tax rate (see also Chay et al, 2005; Graham et al, 2012).

Boyer and Russell (1995) argue for reduction in tax rates on income in order to promote economic growth. In the same spirit, Heckman et al (1998) warn that such tax reduction should not be financed by consumption tax alone as such a tax favors *investment* capital at the expense of human capital thereby constraining potentials for growth in human capital stock. In fact, Judd (1998) speculates that human capital could have higher return when compared with financial assets (for related argument, see Becker, 2009) but that the price of risk applied to human is lower than corporate equity and other financial assets (see Kenny, 2005; Sanders and Taber, 2012, for more on taxation dynamics of human capital). According to Tanzi (1969), taxing capital gains fairly and optimally becomes a central equation in fiscal considerations especially if one considers the argument of Tanzi (2011).

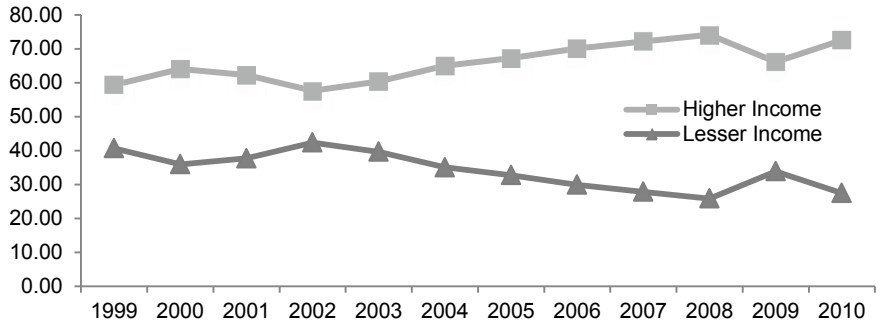
As capital gains taxation is considered an important element in the equation of fiscal adequacy, one can also appreciate its potential to influence the consumption/savings and risk-taking behaviors of individuals and other economic units. For example, the magnitude and allocation of investments may respond to changes in capital gains tax rate. However, the interplay of ordinary income tax and preferential capital gains tax rate potentially could moderate the degree of investment risk-taking in the system. That is, the preferential nature of capital gains taxation, the progressivity of the income tax rates coupled with the deduction of losses limits may encourage healthy balance in the risk-taking activities in the economy. In fact, Kenny (2005) asserts that preferential tax rate on capital gains does not necessarily increase risk taking. The relevance of capital gains taxation to pricing and trading decisions in the stock market is undeniable (see Hanlon and Heitzman, 2010; Arnold et al., 2011).

Typically, in a no-tax regime, investors should accelerate the realization of capital gains, ceteris paribus. However, they may choose to accumulate the gains in order to either net capital losses therefrom; or rebalance such capital gains and capital losses at death, at which time the inherited capital assets reset to the existing market price. The latter is no doubt a major loophole that high-end taxpayers enjoy; a loophole many believe is unfair. It can be further argued that this loophole impedes market liquidity no less than upward change in capital gains tax rate. Closing loopholes is a way to ensure that the tax base approximates closely economic income in a comprehensive manner. One reason for such a delay in realization is that investors consider capital gains tax liability as additional 'transaction costs'.

Jin (2006) suggests that capital gains tax component of the transaction costs could sometimes be higher than the conventional costs. Therefore, investors are expected to adjust their investment behaviors 'rationally' to changes in capital gains tax rates. However, the author suggests that such behavioral response differ between a 'tax sensitive' and 'tax insensitive' taxpayer, claiming that the former group are more 'sensible' than the latter in their trading patterns. He also notes the asymmetry of prices reactions vis-à-vis cumulative capital gains within the context of costly arbitrage. Among its proponents, preferential capital gains treatment is believed to be 'self-financing' due to increase in investment-capital accumulation (Kenny, 2005). This argument alludes to the universal acceptability of preferential capital gains tax rate relative to ordinary income rates. However, the optimum range of rates between capital gains and income taxation remains an empirical issue (see Conesa and Krueger, 2006; Peterman, 2012).

This becomes important if one considers the reality that capital gains inherently is regressive due to the asymmetry of concentration of such gains at the higher-end taxpayers. For example, in 2009, approximately two-thirds (72% in 2010) of taxable net gain was concentrated in the hands of taxpayers with $500,000 dollars or more in adjusted gross income (see Figure 1 and Table 1). In addition to preventing double taxation and locking-in of gains, the main argument for the preferential treatment of capital gains income is that it stimulates growth in investment, job and the economy. However, the link between capital gains tax rate and economy growth is at best unclear. In fact, the current study shows statistically insignificant relationship between the two. Therefore, increasing capital gains from 15% to 20% in the fiscal cliff negotiated package in 2013 between the Congress and the White House provides a context for reexamination of capital gains taxation dynamics in the U.S. So the research question is: do stock market investments increase/reduce in years when capital gains tax rates fall/increase?

Figure 1: Taxable Net Capital Gains by Income Group (1999 – 2010)



This figure shows the percentage of concentration of capital gains wealth by the following income groups: Higher Income = Taxpayers with Adjusted Gross Income of $500, 000 or more Lesser Income = Taxpayers with Adjusted Gross Income of Less than $500,000

Table 1: Taxable Net Gains by Income Group (1999 – 2009)

	[1]	[2]
Year	**Capital Gains Held by High Income Taxpayers (%)**	**Capital Gains Held by Other Taxpayers (%)**
1999	59.32	40.68
2000	64.05	35.95
2001	62.28	37.72
2002	57.63	42.37
2003	60.37	39.63
2004	64.94	35.06
2005	67.22	32.78
2006	70.07	29.93
2007	72.15	27.82
2008	74.12	25.88
2009	66.12	33.88

This table shows capital gains held by different groups of income status. High Income = Taxpayers with Adjusted Gross Income of $500, 000 or more Other Taxpayers = Taxpayers with Adjusted Gross Income of Less than $500,000 Source: IRS, Statistics of Income Division, July 2012.

DATA AND METHODOLOGY

Data for this study are obtained from different sources including Department of the Treasury – Office of Tax Analysis; Internal Revenue Service (IRS); Tax Policy Center (TPC); Bureau of Labor Statistics (BLS); Bureau of Economic Analysis (BEA) as well as DataStream Database. For the most part, each of these sources contains similar data that are overlapping but with consistent numbers. This triangulation of sources attests to the accuracy and reliability of the data used in this study. The capital gains data are collected from the TPC. This center substantially aggregates many tax data from the IRS (and some of the sources mentioned above) which is a primary and dependable source of taxation data in the U.S. The stock market indices data are collected from DataStream Database while the GDP figures are collected from the Bureau of Economic Analysis. The sample period covers a-50 Year period from 1960 to 2009 for many of the capital gains taxation analysis (subject to data availability). The frequency of the data observations used in the study is annual. Consistent with the research question of this study and motivated by the review of relevant literature above, the hypothesis stated below, in alternative form, is tested:

Hypothesis: Changes in capital gains tax rate does affect aggregate investments in the U.S. stock market. The following empirical model is used in the analysis:

$$SMI_t = \alpha_0 + \alpha_1 CGRATE_t + \alpha_2 TRCG_t + \alpha_3 GDP_t + \alpha_4 DUMRATE_t + \alpha_5 INTRATE_t + \varepsilon_t \quad (1)$$

Where:

SMI = stock market investments

CGRATE = the maximum capital gains tax rate

TRCG = the total realized capital gains

GDP = gross domestic product

DUMRATE = a categorical variable that equals 1 in the years when CGRATE falls relative to previous grouped year

INTRATE = interaction of DUMRATE and TRCG

The dependent measure (SMI) is run separately in the time-series regression using the three major U.S. stock market indices, i.e., Dow Jones Industrial, S&P 500, and NASDAQ Composite. I understand that there is some overlapping of companies in these indices. The more reason I use them in separate regression analysis instead of combined in one analysis. This effort is to examine if the results are different in these individual but separate indices. For the categorical variable, ten different groupings of years with the same capital gains tax rate are identified. These periods are then used to specifically capture years of increased or reduced capital gains tax rate (see Table 2). The GDP variable is used to control for real fluctuations and variations in the U.S. economy. The variable – TRCG – may appear redundant relative to the dependent measures. However, its inclusion in the specification is conceptually driven. For example, TRCG data points were solely from individuals as they exclude tax-exempt institutions which by nature are not sensitive to capital gains tax rate changes, but which are major players in the stock market (for more, see Jin, 2006). More so, those entities (and even some tax-sensitive ones) have some regulatory obligations and oversights, suggesting that their stock investment decisions are generally not mainly motivated by changes in capital gains tax regime. Also, the specification allows analysis of TRCG with respect to each of the three major stock indices in the U.S. The results discussed below further accentuate this.

Table 2: Maximum Capital Gains Tax Rate

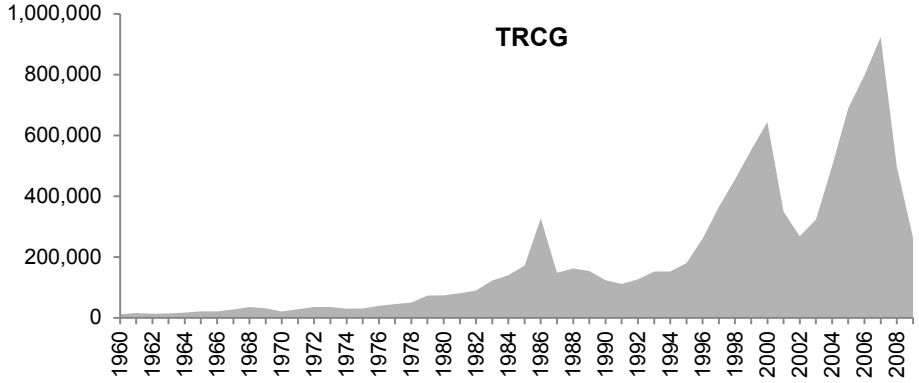
[1] Group	[2] Year Range	[3] Maximum Capital Gains Tax Rate	[4] Group Type
1	1960 - 1967	25%	Reduced
2	1968 -1969	26% - 27.5%	Increased
3	1970 – 1971	32.21% - 34.25%	Increased
4	1972 – 1975	36.5%	Increased
5	1976 – 1978	39.88%	Increased
6	1979 – 1981	28%	Reduced
7	1982 - 1986	20%	Reduced
8	1987 – 1997	28% - 28.93%	Increased
9	1998 – 2003	20% - 21.19%	Reduced
10	2004 - 2009	15% - 16.05%	Reduced

This table shows the maximum capital gains tax rate for the 10 grouped years. Source: Column 3 data comes from Department of the Treasury, Office of Tax Analysis.

RESULTS AND DISCUSSION

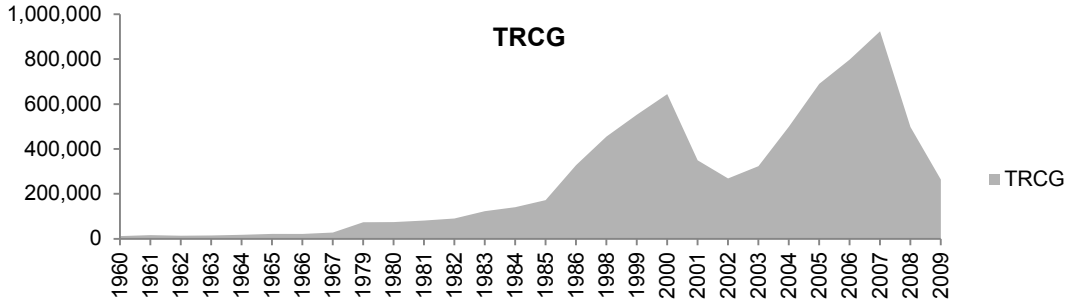
Figures 2 through 4 below provide pictorial representations of the realized capital gains over the 50-year period of this study. It can be deduced from the figures that there is no consistent pattern visibly different from the periods of decrease or increase in capitals gains tax rate. Therefore, in order to further analyze the data, I conduct time-series regression analysis with results presented and discussed below.

Figure 2: Total Realized Capital Gains between 1960 And 2009



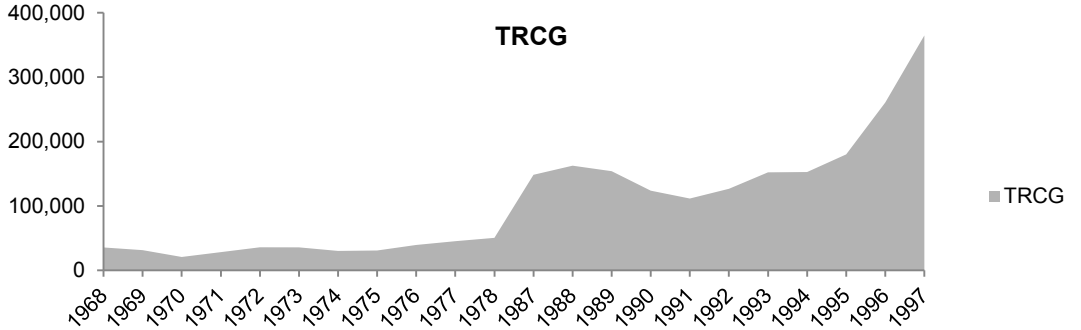
This figure shows the graphical pattern of Total Realized Capital Gains (TRCG) between 1960 and 2009 tax years.

Figure 3: Total Realized Capital Gains between 1960 And 2009 For Reduced Capital Gains Tax Rate Years



This figure shows the graphical pattern of Total Realized Capital Gains (TRCG) between 1960 and 2009 tax years for years of reduced Capital Gains Tax Rate.

Figure 4: Total Realized Capital Gains between 1960 and 2009 For Increased Capital Gains Tax Rate Years



This figure shows the graphical pattern of Total Realized Capital Gains (TRCG) between 1960 and 2009 tax years for years of increased Capital Gains Tax Rate.

Descriptive and Correlation Statistics

The descriptive analysis is presented in Panel A of Table 3. During the study period, the mean (median) of the total realized capital gains is over $196 billion ($123 billion) while the maximum capital gains tax rate has a mean (median) of 26.16% (25.95%). The gross domestic product for same period has a mean (median) of over $5 trillion ($4 trillion). The stock indices of Dow Jones, S&P 500 and NASDAQ have approximately the mean (median) of 3,748 (1,259), 481 (242) and 983 (455) respectively. The GDP figures corroborated by the stock market indices, show that the U.S. economy is vibrant and that total realized capital gains in the economy are substantial, which is approximately 4% of the size of the economy on average during the period under review.

The correlation figures as presented in Panel B of Table 3 are all significant at conventional thresholds. Worth noting is the correlation sign (–) between CGTRATE and all other variables. However, the time-series regression analysis shows a different result. With the level of correlation coefficients reported in the table, a multicolinearity diagnosis reveals that there is no perfect collinearity among the regressors.

Table 3: Descriptive Statistics and Correlation Matrix

	[1]	[2]	[3]	[4]	[5]
Panel A: Descriptive Statistics					
Variables	Mean	Median	Standard Deviation	Q1	Q3
TRCG ($million)	196,276.8	123,278	22,355.44	3,1305	282,287.75
GDP ($billion)	5,204.49	4,074.20	4,346.55	1,210.13	8,447.68
CGTRATE (percent)	26.16	25.95	6.68	21.13	25.95
DJONEs (index)	3,747.86	1,259.39	4,027.28	878.54	7,740.35
SandP500 (index)	481.33	242.17	477.89	97.55	903.25
NASDAQ (index)	983.14	454.82	998.60	195.84	1,950.40
Panel B: Correlation Matrix					
Variables	TRCG	GDP	CGTRATE	DJONEs	SandP500	NASDAQ
TRCG	1					
GDP	0.873***	1				
CGTRATE	-0.647***	-0.633***	1			
DJONEs	0.920***	0.951***	-0.620***	1		
SandP500	0.916***	0.928***	-0.631***	0.982***	1	
NASDAQ	0.861***	0.858***	-0.651***	0.933***	0.972***	1

This table shows the descriptive and correlation matrix for the listed variables. Note on Panel A: The period of analysis covers a 50-year span between 1960 and 2009. TRCG is the Total Realized Capital Gains; GDP is the Gross Domestic Product; CGRATE is the maximum capital gains tax rate: DJONEs is the Dow Jones Industrial; SandP500 is the Standard & Poor's 500; NASDAQ is the Nasdaq Composite. Not on Panel B: Variables remain as described above. All correlations are significant at conventional thresholds., **, *** indicate significance at the 10, 5, and 1 percent levels respectively.*

Regression Results

The regression results are contained in Table 4. Column 1 contains the anticipated coefficient signs for each independent variable. For example, I expect TRCG to have a positive sign, meaning that an increase in realized capital gains is a direct evidence of an increase in stock investments in the U.S. Similar expectation goes for the GDP variable. However, the CGTRATE variable has a negative expectation sign because consistent with general belief (and corroborated by the correlation statistics mentioned above), a drop in capital gains tax rate should increase stock market investments. Recall that DUMRATE is a dummy variable that equals one in the years when CGRATE falls relative to previous grouped year. So, the expectation is that the coefficient of this variable will be negative. The INTRATE is the interaction of DUMRATE and TRCG which coefficient is estimated to be positive, meaning that in years when

CGRATE falls relative to previous grouped year, TRCG is expected to show an increase in stock market investments. In the regression analysis, all the variables exhibit signs consistent with expectations with the exception of the CGTRATE, which is positive in the analysis. This sign is counterintuitive as it implies that in years when the maximum capital gains tax rate is low (high), investments in stock market

as proxied by the three major stock indices in the U.S. is low (high). Interestingly, this counterintuitive result is corroborated in the analysis by the direct relationship between CGTRATE and TRCG.

Table 4: Regression Coefficients

	[1]	[2]	[3]
Variables	**Expected Sign**	**Coefficients**	**t-statistics**
Panel A {Dependent: SMI (DJONEs)			
TRCG	+	0.378***	4.933
GDP	+	0.717***	8.860
CGTRATE	-	0.149*	1.779
DUMRATE	-	-0.042	-0.165
INTRATE	+	0.164	0.748
R2		0.941	
Panel B {Dependent: SMI (SandP500)			
TRCG	+	0.489***	5.216
GDP	+	0.643***	6.531
CGTRATE	-	0.095	0.903
DUMRATE	-	-0.421	-1.352
INTRATE	+	0.461*	1.748
R2		0.913	
Panel C {Dependent: SMI (NASDAQ)			
TRCG	+	0.487***	3.333
GDP	+	0.661***	3.947
CGTRATE	-	0.314	1.535
DUMRATE	-	-0.180	-0.370
INTRATE	+	0.359	0.919
R2		0.827	

*This table shows the regression coefficients for equation 1. The period of analysis covers a 50-year span between 1960 and 2009. Panel A has DJONEs, Panel B has SandP500 and Panel C has NASDAQ as the dependent measures respectively. TRCG is the Total Realized Capital Gains; GDP is the Gross Domestic Product; CGRATE is the maximum capital gains tax rate: DJONEs is the Dow Jones Industrial; SandP500 is the Standard & Poor's 500; NASDAQ is the Nasdaq Composite; DUMRATE is a categorical variable that equals 1 in the years when CGRATE falls relative to previous grouped year; INTRATE is interaction of DUMRATE and TRCG. The numbers in column [2] are Standardized Beta Coefficients. *, **, *** indicate significance at the 10, 5, and 1 percent levels respectively.*

One explanation for the result could be that investors willing to unlock wealth of capital gains may want to take advantage of capital loss realization in order reduce such gains even during the period of higher capital gains tax rate. This becomes plausible if one considers the fact that from marginal tax rate analysis perspective, $1 dollar of a loss (gain) worth more (less) during years of higher marginal tax rates. However, because the variable (CGTRATE) is not significant at the 5% conventional threshold, further interpretation needs to be made with caution.

Further, it is only the TRCG and GDP variables that are statistically significant. Reporting the standardized beta figures, the coefficient (t-statistics) of TRCG 0.378 (4.933) in DJONEs; 0.489 (5.216) in SandP500; and 0.487 (3.333) in NASDAQ. With a non-significant capital gains tax rate, these results indicate that total realized capital gains and not the capital gains rate impacts stock market liquidity after controlling for the overall economic activity as captured by the GDP variable which expectedly is highly significant in all the three regression models. In addition, this study shows that in terms of the magnitude of the coefficients and the t-statistics, total realized capital gains impacts stock market investments more through the S&P 500 index, followed by the NASDAQ and then the Dow Jones indices. However, Down Jones index appears to lead other indices in years when Gross Domestic Product is high. Together, this may be value-relevant to investors in their investment decision choices.

Additional Analysis

On the real econometric concerns of autocorrelation potentially inherent in time series observations used in this study, a one-year lagged *(t-1)* variable of each of the dependent measures is introduced in the regression equation above thus:

$$SMI_t = \alpha_0 + \alpha_1 CGRATE_t + \alpha_2 TRCG_t + \alpha_3 GDP_t + \alpha_4 DUMRATE_t + \alpha_5 INTRATE_t + \alpha_6 SMI_{t-1} + \varepsilon_t \quad (2)$$

The results from the t-statistics show consistent non-significance coefficients of the CGTRATE variable in all the three analysis (DJONEs (1.069), SandP500 (0.860) and NASDAQ (1.488)). In other words, the findings are substantially similar to those of the original model specification.

It must be mentioned that even if there are autocorrelation issues in the model, it should bias the t-value of the regression parameter's estimate in favor of CGTRATE (a main variable of interest) attributing overstated t-ratio to it, thus making it statistically significant. But this variable consistently exhibits statistical insignificance in the analyses across all the three dependent measures. Also, it must be noted that autocorrelation is a common and more severe problem in daily, weekly or monthly data relative to yearly data, the interval used in this study. In spite of the conceptual rationale, the TRCG variable was completely removed from equations (1) and (2) above in order to examine whether it takes explanatory power away from CGTRATE. Still CGTRATE remains, non-significant across the three dependent measures in all specifications. For example, for equation 1 (equation 2), the t-statistics for DJONEs = 1.712 (0.101), SandP500 = 1.240 (0.201) and NASDAQ = 1.905 (0.968). In other words, the tenor of the findings remains unchanged. Also, due to the fact that the period between 1987 and 1997 experienced unusual rapid increase in stock prices, added analysis were made to specifically examine the stock market reactions to capital gains rate during this period.

The findings are substantially similar. Further, I reexamine the regression analysis (albeit with slightly shorter time horizon) using long term capital gains, qualitatively similar results are found. Notwithstanding the above findings, caution should be exercised in interpreting the results/findings of this study. For example, the high R-Squared number reported in Table 4 is consistent with studies having similar econometric properties like the current one. Therefore, it should not necessarily be interpreted as an indication of a good model fit. Greene (2012) clearly states that "…in fact, in using aggregate time-series data, coefficients of determination this high (94.64) are routine" (pp. 45). Also, this analysis excludes state capital gains effect. In addition, it is worthy to note that investors' trading behaviors depend largely on their expectations and horizon (see Gaspar et al., 2013). A pessimistic (optimistic) investor will sell more (less) albeit higher (lower) capital gains tax rate.

Further, even though the tax law substantially prevents taxpayers from converting the character of ordinary income into tax-favored capital gains, by and large, sophisticated taxpayers could still engage in sophisticated and complex tax avoidance strategies. There is also the econometric specification concern regarding omitted variable, which could bias the coefficient estimates. Even though it is believed that autocorrelation "will not affect the unbiasedness or consistency of the OLS regression estimators, it does affect their efficiency" (Pindyck and Rubinfeld, 1998) by making OLS to underestimate the standard error of the coefficients relative to the true standard error. In other words, to the extent that one or combination of these caveats occurs, the tenor of the findings of this study could be biased. Future study could examine how long into the future does the response effect (if any) of changes in capital gains tax rate last. Also, the negative sign of the capital gains tax rate found in the current study deserves further research analysis; notwithstanding its statistical insignificance as reported in this study. This becomes more important if one considers the direct relationship between this variable and the total realized gains variable.

CONCLUSION

This study examines stock market investments responses to changes in capital gains tax rate, and finds that capital gains realization and not capital gains tax rates impacts stock market investments in the U.S.

The sample period covers a-50 Year period from 1960 to 2009, using data obtained from different sources including Department of the Treasury – Office of Tax Analysis; Internal Revenue Service (IRS); Tax Policy Center (TPC); Bureau of Labor Statistics (BLS); Bureau of Economic Analysis (BEA) as well as DataStream Database. The following caveats suggest that caution needs to be applied in interpreting the findings of this study. The analysis excludes state capital gains effect and depending on the state of tax residence of the investor, the combined tax burden may be material. It must also be noted that investors trading behaviors depend largely on their expectations and horizon. In addition, sophisticated taxpayers may engage in complex tax avoidance gimmicks to game the capital gains tax system by converting the character of ordinary income into tax-favored capital gains. Further, there is also the econometric specification concern regarding omitted variable, which could bias the coefficient estimates. Therefore, to the extent that one or combination of these caveats occurs, the tenor of the findings of this study could be biased. Finally, future study could examine how long into the future does the response effect (if any) of changes in capital gains tax rate last. Also, the negative sign of the capital gains tax rate found in the analysis deserves further research analysis; notwithstanding its statistical insignificance as reported in this study.

REFERENCES

Arnold, J. M., Brys, B., Heady, C., Johansson, Å., Schwellnus, C., & Vartia, L. (2011). Tax Policy for Economic recovery and growth. *The Economic Journal*, 121(550), 59-80.

Auten, G. (1999). Capital Gains Taxation: From The Encyclopedia of Taxation and Tax Policy.

Barber, B., & Odean, T. (2000). Trading is hazardous to your wealth: The common stock investment performance of individual investors. *Journal of Finance*, 55, 773-806.

Becker, G. S. (2009). Human capital: A theoretical and empirical analysis, with special reference to education. University of Chicago Press.

Boyer, D. J., & Russell, S. M. (1995). Is it time for a consumption tax? *National Tax Journal*, 48(3), 363-372.

CBO. (2002). Capital gains taxes and federal revenues. Retrieved from http://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/38xx/doc3856/taxbrief2.pdf

CBO. (2011). Reducing the deficit: Spending and revenue options. Retrieved from http://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/120xx/doc12085/03-10-reducingthedeficit.pdf

Chay, J. B., Choi, D., & Pontiff, J. (2005). Market valuation of tax-timing options: Evidence from capital gains distributions. *Journal of Finance*, 61(2), 837-865.

Conesa, J. & Krueger, D. (2006). On the optimal progressivity of the income tax code. *Journal of Monetary Economics,* 53(7), 1425-1450.

Elton, E. J., Gruber, M. J., Blake, C. R., Krasny, Y., & Ozelge, S. O. (2010). The effect of holdings data frequency on conclusions about mutual fund behavior. *Journal of Banking & Finance,* 34(5), 912-922.

Gaspar, J. M., Massa, M., Matos, P., Patgiri, R., & Rehman, Z. (2013). Payout policy choices and shareholder investment horizons. *Review of Finance*, 17(1), 261-320.

Graham, J. R., Raedy, J. S., & Shackelford, D. A. (2012). Research in accounting for income taxes. *Journal of Accounting and Economics*, 53(1), 412-434.

Greene, W. H. (2012). Econometric Analysis. (Seventh Edition), Prentice-Hall International Inc. New York University.

Hanlon, M., & Heitzman, S. (2010). A review of tax research. *Journal of Accounting and Economics,* 50(2), 127-178.

Heckman, J. J., Lochner, L., & Taber, C. (1998). Tax policy and human capital formation. *American Economic Review*, 88, 293-297.

Hong, H., & Stein, C. (2003). Differences of opinion, short sales constraints, and market crashes. *Review of Financial Studies*, 16, 487-525.

Ivkovich, Z., Poterba, J., & Weisbenner, S. (2004). Tax-motivated trading by individual investors (Working Paper No. 10275). Retrieved from National Bureau of Economic Research website: http://www.nber.org/papers/w10275

Jin, L. (2006). Capital gains tax overhang and price pressure. *Journal of Finance*, 61(3), 1399-1431.

Judd, K. L. (1998). Taxes, uncertainty and human capital. *American Economic Review*, 88 (2), 289-292.

Kenny, P. (2005). Australia's capital gains tax discount: More certain, equitable and durable? *Journal of the Australasian Tax Teachers Association*, 1 (2), 38-107.

Moore, S. (2008). Capital gains taxes. The Concise Encyclopedia of Economics. Retrieved from the Library of Economics and Liberty website: http://www.econlib.org/library/Enc/capitalgainstaxes.html

Peterman, W. B. (2012). Determining the motives for a positive optimal tax on capital. *Journal of Economic Dynamics and Control*, 37(1), 265-295.

Pindyck, R. S. & Rubinfeld, D. L. (1998). Econometric models and economic forecasts. McGraw-Hill, New York.

Poterba, J. (1987). How burdensome are capital gains taxes: Evidence from the United States. *Journal of Public Economics*, 33, 157-172.

Sanders, C., & Taber, C. (2012). Life-Cycle Wage Growth and Heterogeneous Human Capital. *Annual Review of Economics*, 4(1), 399-425.

Sialm, C., & Starks, L. (2012). Mutual fund tax clienteles. *Journal of Finance*, 67(4), 1397-1422.

Sikes, S. A., & Verrecchia, R. E. (2012). Capital gains taxes and expected rates of return. *The Accounting Review*, 87(3), 1067-1086.

Tanzi, V. (1969). The individual income tax and economic growth: An international comparison. Johns Hopkins Press.

Tanzi, V. (2011). Government versus markets: The changing economic role of the state. Cambridge University Press.

Zeng, T. (2009). Stock price reactions to the Canadian Lifetime Capital Gains Exemption. *Accounting & Taxation*, 1(1), 75-85.

ACKNOWLEDGEMENT

I will like to thank the journal editors, two anonymous reviewers and colleagues at the University of Texas – Pan American for their constructive critiques and insightful comments.

BIOGRAPHY

Dr. Akinloye Akindayomi is an Assistant Professor of Accounting, and the Director of Undergraduate Program in the Department of Accounting and Business Law at the College of Business Administration, University of Texas – Pan American (UTPA). He can be contacted at: 1201 West University Drive, Edinburg, Texas 78539-2999, U.S.A. Phone: (956) 665 – 7842. Email: akinloyea@utpa.edu.