

Internet Appendix

Taxing the Disposition Effect: The Impact of Tax Awareness on Investor Behavior

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Experiment Instructions

You will be given 350 experimental dollars to invest in three different stocks. Your job is to choose when to buy and sell each stock, so that you earn the most after-tax money by the end of the experiment. Throughout the experiment, you will see the stock prices change and you can use this information to decide when to buy and sell. When you sell a stock, you receive cash that is net of the trade's tax implications. If you sell a stock that has increased in value, a capital gains tax of 15% will be charged. If you sell a stock that has declined in value, the cash loss will be reduced by 15%.

You will start the experiment with 1 share of Stock A, 1 share of Stock B, and 1 share of Stock C. Each share is worth \$100. You will also start with \$50 in cash. For the remainder of the experiment, you are only allowed to hold either 1 share or 0 shares of each stock, and the rest of your portfolio is held in cash. The cash balance can be positive or negative. Either way, the cash balance earns a 0% return.

Structure of the Market

The experiment will begin by showing you information about the price history for Stock A, Stock B, and Stock C over the past nine periods. Then, you will have nine trading sessions where you decide whether to buy or sell one of the three stocks.

In each trading session, you will be given a price update for either Stock A, Stock B, or Stock C. One of the three stocks will be randomly selected and you will see if the selected stock price has gone up or down, and by how much.

Then, you will be asked whether you would like to trade the stock and you have to answer "yes" or "no." You will see whether you currently own 1 or 0 shares of the stock. If you choose "yes" and you own 1 share, you will sell it. If you choose "yes" and you own 0 shares, you will buy 1 share. If you choose "no," then you will keep your current position of 0 or 1 shares.

How Stock Prices Change

The prices of Stock A, Stock B, and Stock C all change over time according to the same rule. At any time, each stock is either in a “good state” or a “bad state.” A stock in the good state has a 70% chance of going up and a 30% chance of going down in the next period. A stock in the bad state has a 30% chance of going up and a 70% chance of going down in the next period. In either state, the size of the stock price change is equally likely to be \$5, \$10, or \$15. After each time period, there is a 20% chance that the stock switches state.

Table IA1: Experimental Evidence on Tax Salience and Portfolio Concentration

This table reports OLS regression estimates on the relationship between tax salience and portfolio concentration among our experimental participants. The dependent variable is the experimental subject's number of unique stock holdings at the conclusion of the experiment. The key explanatory variable of interest is TAX_SALIENCE, an indicator variable that equals 1 if the participant is randomly assigned to the High-salience (treatment) condition, and 0 otherwise. The other variables are defined in Appendix I. We estimate White (1980) heteroskedasticity-robust standard errors and t -statistics are in parentheses. The *, **, and *** symbols indicate significance at the 10%, 5%, and 1% levels, respectively.

	1	2	3	4	5
TAX_SALIENCE	0.130*	0.132*	0.130*	0.125*	0.127**
	(1.90)	(1.94)	(1.92)	(1.85)	(1.97)
AGE		0.022	0.018	0.021	0.022
		(1.29)	(1.05)	(1.21)	(1.32)
EDUCATION		0.024	0.023	0.020	0.018
		(0.96)	(0.90)	(0.82)	(0.78)
INCOME		-0.042	-0.028	-0.007	0.005
		(-0.98)	(-0.57)	(-0.13)	(0.09)
GENDER		-0.034	-0.037	-0.041	-0.033
		(-0.99)	(-1.04)	(-1.14)	(-0.96)
RACE		0.004	0.002	0.005	0.008
		(0.28)	(0.12)	(0.30)	(0.53)
RISK_AVERSION		0.023***	0.019**	0.019**	0.020**
		(3.16)	(2.24)	(2.36)	(2.57)
FINANCIAL_LITERACY			0.047	0.047	0.046
			(1.12)	(1.13)	(1.13)
TRUST_MARKET			-0.004	0.007	0.003
			(-0.16)	(0.31)	(0.12)
INVESTOR			0.007	0.031	0.034
			(0.09)	(0.38)	(0.43)
EMPLOYMENT_STATUS			-0.016	-0.015	-0.008
			(-0.54)	(-0.51)	(-0.30)
OPTIMISM				-0.085***	-0.079***
				(-3.31)	(-3.13)
ECONOMIC_OUTLOOK				0.065*	0.057*
				(1.81)	(1.66)
POLITICS				-0.013	-0.020
				(-0.63)	(-0.96)
TASK_DURATION					-0.000
					(-0.24)
ATTENTION_CHECK					-0.025
					(-0.29)
N	699	699	699	699	699
Adj. R^2	0.004	0.025	0.022	0.033	0.029

Table IA2: Interactive Effects of Tax Salience on the Disposition Effect

This table reports OLS regression estimates of the effects of tax salience on the disposition effect for our experimental subjects. The dependent variable is the subject's, DISPOSITION_EFFECT, calculated as the proportion of gains realized less the proportion of losses realized. TAX_SALIENCE is an indicator variable that equals 1 if the participant is randomly assigned to the High-salience (treatment) condition, and 0 otherwise. The other variables are defined in Appendix I. We estimate White (1980) heteroskedasticity-robust standard errors and t -statistics are in parentheses. The *, **, and *** symbols indicate significance at the 10%, 5%, and 1% levels, respectively.

	1	2	3	4
TAX_SALIENCE	-0.078** (-2.39)	-0.159** (-2.50)	-0.123** (-2.47)	-0.094*** (-2.66)
TAX_SALIENCE \times TRUST_MARKET	-0.008 (-0.40)			
TAX_SALIENCE \times FINANCIAL_LITERACY		0.035 (1.27)		
TAX_SALIENCE \times INVESTOR			0.067 (1.06)	
TAX_SALIENCE \times RACIAL_MINORITY				0.055 (0.79)
RACIAL_MINORITY				-0.044 (-0.88)
TRUST_MARKET	0.002 (0.14)	-0.002 (-0.14)	-0.002 (-0.14)	-0.002 (-0.15)
FINANCIAL_LITERACY	-0.033* (-1.84)	-0.051** (-2.22)	-0.034* (-1.90)	-0.034* (-1.88)
INVESTOR	-0.021 (-0.62)	-0.022 (-0.65)	-0.054 (-1.14)	-0.021 (-0.61)
Controls	Yes	Yes	Yes	Yes
N	699	699	699	699
Adj. R^2	0.087	0.088	0.088	0.088

Table IA3: Heterogeneous Trading Behavior in Response to the State Tax Rate Changes

This table reports OLS regression estimates of the effects of state tax rate reductions on the disposition effect. The dependent variable is DISPOSITION_EFFECT, the proportion of gains realized less the proportion of losses realized. POST₁₉₉₄ equals 1 if the year is 1995, and 0 otherwise. TAX_REDUCE_STATE equals 1 if the investor resides in a state which reduced its tax rate, and 0 otherwise. Controls in the regressions include the investor's AGE, AGE_SQ., HOMEOWNER, INCOME, MALE, and MARRIED. All variables are defined in Appendix I. We cluster standard errors at the state-level and *t*-statistics are in parentheses. The *, **, and *** symbols indicate significance at the 10%, 5%, and 1% levels, respectively.

	1	2	3	4	5
POST ₁₉₉₄ × TAX_REDUCE_STATE	-0.030** (-2.46)	-0.021* (-1.70)	-0.035** (-2.18)	-0.033* (-1.72)	-0.012** (-2.18)
POST ₁₉₉₄ × TAX_REDUCE_STATE × DECEMBER	-0.053 (-0.90)				
POST ₁₉₉₄ × TAX_REDUCE_STATE × HIGH_INCOME		-0.035* (-1.72)			
POST ₁₉₉₄ × TAX_REDUCE_STATE × RETIREMENT			0.011 (0.37)		
POST ₁₉₉₄ × TAX_REDUCE_STATE × MARRIED				-0.001 (-0.03)	
POST ₁₉₉₄ × TAX_REDUCE_STATE × HOMEOWNER					0.004 (0.41)
DECEMBER	-0.069** (-2.26)				
HIGH_INCOME		-0.078 (-1.52)			
RETIREMENT			-0.059* (-1.85)		
MARRIED				0.026 (0.72)	
HOMEOWNER					0.018*** (3.02)
POST ₁₉₉₄	0.034*** (2.88)	0.032*** (3.54)	0.035** (2.58)	0.040*** (2.64)	0.006 (1.13)
Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes
N	12,926	12,926	12,926	12,926	12,926
Adj. R ²	0.020	0.021	0.016	0.015	0.004

Table IA4: Tax Rate Reductions and Trading in Dividend-Paying Stocks

This table reports OLS regression estimates for the impact of an investor's state tax rate reductions on the propensity to trade stocks that pay dividends. The dependent variable, SALE, equals 1 if the investor sells the stock in the month, and 0 otherwise. GAIN equals 1 if the price appreciated during the month, and 0 otherwise. POST₁₉₉₄ equals 1 if the year is 1995, and 0 otherwise. TAX_REDUCE_STATE equals 1 if the investor resides in a state which reduces its tax rate, and 0 otherwise. DIVIDEND_PAYER equals 1 if the stock pays a dividend during the year, and 0 otherwise. Controls in the regressions include the investor's AGE, AGE_SQ., HOMEOWNER, INCOME, MALE, and MARRIED. For parsimony, we suppress estimates on the ancillary indicators and interaction terms. All variables are defined in Appendix I. We cluster standard errors at the state-level and *t*-statistics are in parentheses. The *, **, and *** symbols indicate significance at the 10%, 5%, and 1% levels, respectively.

	1	2	3
POST ₁₉₉₄ × TAX_REDUCE_STATE × DIVIDEND_PAYER	-0.016 (-1.17)	-0.015 (-1.09)	-0.022 (-1.19)
GAIN		0.059*** (14.45)	0.037*** (3.02)
GAIN × POST ₁₉₉₄ × TAX_REDUCE_STATE			-0.035* (-1.73)
GAIN × POST ₁₉₉₄ × TAX_REDUCE_STATE × DIVIDEND_PAYER			0.019 (0.67)
DIVIDEND_PAYER	-0.003 (-0.63)	-0.004 (-0.71)	-0.002 (-0.18)
POST ₁₉₉₄	0.133*** (9.76)	0.127*** (9.72)	0.110*** (10.54)
TAX_REDUCE_STATE	0.120*** (5.76)	0.145*** (7.16)	0.144 (1.54)
Controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
State FE	Yes	Yes	Yes
N	31,771	31,771	31,771
Adj. <i>R</i> ²	0.035	0.043	0.044

Table IA5: Summary Statistics for the Full Sample of Individual Investors

This table reports descriptive statistics for the full sample of U.S. retail investors. The sample period is from 1991 through 1996. All variables are defined in Appendix I.

	Mean	Standard Deviation	N
DISPOSITION_EFFECT	0.020	0.277	209,018
PGR	0.064	0.223	209,018
PLR	0.044	0.187	209,018
POST ₁₉₉₄	0.185	0.388	209,018
TAX_REDUCE_STATE	0.085	0.279	209,018
AGE	47.716	18.415	209,018
AGE_SQ.	2,616.021	1,601.690	209,018
HOMEOWNER	0.884	0.321	209,018
INCOME	6.188	2.001	209,018
MALE	0.906	0.292	209,018
MARRIED	0.723	0.447	209,018

Table IA6: State Tax Reductions and Individual Investor Trading Behavior in the Full Sample

This table reports OLS regression estimates of the effects of tax rate reductions on the disposition effect. Columns 1 through 3 show estimates from the full sample. For reference, Column 4 reports estimates from the matched sample. The dependent variable is DISPOSITION_EFFECT, the proportion of gains realized less the proportion of losses realized. AGE_SQ.₁₉₉₄ equals 1 if the year is 1995, and 0 otherwise. TAX_REDUCE_STATE equals 1 if the investor resides in a state that reduces its tax rate, and 0 otherwise. The key explanatory variable is POST₁₉₉₄ × TAX_REDUCE_STATE, which measures the change in the disposition effect among investors following the tax rate reductions. Controls in the regressions include the investor's AGE, AGE_SQ., HOMEOWNER, INCOME, MALE, and MARRIED. All variables are defined in Appendix I. We cluster standard errors at the state-level and *t*-statistics are in parentheses. The *, **, and *** symbols indicate significance at the 10%, 5%, and 1% levels, respectively.

	1	2	3	4 Matched Sample
POST ₁₉₉₄ × TAX_REDUCE_STATE	-0.011** (-2.60)	-0.011*** (-2.68)	-0.011*** (-2.76)	-0.033*** (-2.90)
POST ₁₉₉₄	0.009** (2.56)	-0.002 (-0.67)	-0.002 (-0.77)	0.036*** (3.11)
TAX_REDUCE_STATE	-0.001 (-1.00)	-0.001 (-0.72)	0.031 (0.72)	
Controls	No	Yes	Yes	Yes
Year FE	No	Yes	Yes	Yes
State FE	No	No	Yes	Yes
N	209,018	209,018	209,018	12,926
Adj. <i>R</i> ²	0.000	0.001	0.001	0.016

Table IA7: State Tax Rates and the Disposition Effect

This table reports OLS regression estimates for the impact of tax rates on the disposition effect. The dependent variable is DISPOSITION_EFFECT, the proportion of gains realized less the proportion of losses realized. The key explanatory variable is TAX_RATE, the state-level tax rate applied to investment gains and losses. All variables are defined in Appendix I. We cluster standard errors at the state-level and t -statistics are in parentheses. The *, **, and *** symbols indicate significance at the 10%, 5%, and 1% levels, respectively.

	1	2	3
TAX_RATE	-0.004 (-0.11)	0.001 (0.02)	0.047 (1.04)
AGE		-0.000 (-0.08)	-0.000 (-0.18)
AGE_SQ.		-0.000* (-1.83)	-0.000 (-1.66)
INCOME		-0.001*** (-3.06)	-0.001*** (-3.29)
HOMEOWNER		0.005** (2.53)	0.005** (2.28)
MALE		0.002 (0.77)	0.002 (0.89)
MARRIED		0.001 (0.76)	0.001 (0.71)
Year FE	No	Yes	Yes
State FE	No	No	Yes
N	230,866	230,866	230,866
Adj. R^2	-0.000	0.002	0.002