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How Did the Extension of the U.S. Dividend Tax Cuts in 2010 Affect Stock Prices?

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CLAREMONT McKENNA COLLEGE
HOW DID THE EXTENSION OF THE U.S. DIVIDEND TAX CUTS IN 2010 AFFECT
STOCK PRICES?

SUBMITTED TO
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AND
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BY
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FOR
SENIOR THESIS
SPRING 2011
25 APRIL 2011

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Abstract

The efficacy of the 2001 and 2003 Bush tax cuts was a major topic of discussion in the 2010 midterm elections. I investigate the effect of the possible expiration and eventual extension of the dividend tax cut on US stock market performance in 2010 based on the methodology used by Amronin, Harrison and Sharpe (2008). I compare aggregate performance of US common stocks relative to foreign stocks using equity indices, and examine cross-sectional performance amongst US stocks by creating different stock portfolios based on their dividend yield. This comparison is done over two event windows, (1) 20-24 September 2010 and (2) 3-8 December 2010. Consistent with previous studies, I find that the US stock market did respond to negative and positive news on the extension of the Bush-era dividend tax cuts, with stock prices falling and rising, respectively. My findings also suggest that this aggregate effect was probably muted by the redistribution of funds by investors from lower-yield to higher-yield stocks. Unlike in 2003, however, in the post-financial crisis context of 2010, the redistribution seemed to particularly favor stocks with medium-dividend yield, rather than smaller, higher-risk stocks with the highest dividend yield.

Introduction

In 2010, the Economic Growth and Tax Relief Reconciliation Act of 2001 (EGTRRA, often referred to as the 2001 Bush Tax Cuts) and Jobs and Growth Tax Relief Reconciliation Act of 2003 (JGTRRA, also known as the 2003 Bush Tax Cuts) came up for debate in Congress. Amongst the tax rates that were set to increase were taxes on individual dividend tax income, which had been lowered in the 2003 JGTRRA. If the tax cuts expired, dividend taxes would rise from 15% to the 1990s rate of up to 39.6%. The dividend tax cuts had initially been set to expire on 31 December 2008, but were extended by the Tax Increase Prevention and Reconciliation Act of 2005 (TIPRA), which pushed their expiration date to 31 December 2010.

The main issue of contention in 2010 was the extension of the tax cuts for taxpayers of all income levels; Democrats wanted the tax cuts to expire for higher-income earners¹, while Republicans were in support of making the tax cuts permanent for all. In addition, Congressmen on both sides of the aisle argued that the tax cuts should not be allowed to expire in 2010 because of the state of the economy; they argued that extending the dividend tax cut would keep the cost of equity capital low, stimulate investment by firms and thus lead to economic growth and job creation. The 111th Congress eventually passed the Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010², which extended the Bush Tax Cuts, including the dividend tax cuts, for all income levels until 2012. In addition, the bill extended jobless benefits and business tax relief measures³ and reduced payroll taxes by 2% in calendar year 2011. It also alters the Internal Revenue Service code to exempt estates worth less than \$5

¹ i.e. Individuals who earned more than \$200,000 and couples with a combined income of more than \$250,000

²The bill, H.R. 4856 was signed into Public Law 111-312 by President Obama on 17 December 2010

³ E.g. Allowing for accelerated depreciation of capital expenditure

million⁴ from being subject to an estate tax, and sets the maximum estate tax at 35% (Congressional Research Service, 2010).

The effect of these tax cuts is a major issue of debate, particularly given the ballooning federal deficit, and the direct impact tax cuts have on worsening that deficit. However, although a great deal of literature exists that evaluates the effect of the implementation of the 2003 tax cuts on US stock market performance, there is no broad consensus on whether they were good or bad for US stocks. While this lack of consensus is not surprising for such a highly politicized topic, the importance of the topic should motivate further research in order to gain an accurate understanding of the situation. The events of 2010, which saw the tax cuts under threat of expiry and eventually extended, provide an opportunity to do just that. Specifically, this paper uses the methodology set out in Amronin, Harrison and Sharpe (2008) to test the hypothesis that the threat of the 2003 dividend tax expiring cuts lowered US stock prices, while their extension boosted US stock prices. This reaction would reflect whether the market believed the tax cuts were good for the economy.

Literature Review

The effect of individual-level dividend taxes on stock prices has been the topic of much economic research, with the literature examining both aggregate-level and cross-sectional effects.

On an aggregate level, Poterba (2004) hypothesized that the dividend tax cut would reduce the tax burden on projected dividend payouts, increasing firm value and thus stock prices. He capitalizes annual foregone tax revenue as a crude measure of the gain in US equities, and estimates a 6% gain in US equities in the first 2 quarters of 2003. Auerbach and Hassett (2005)

⁴ \$10 million per couple

also find that a reduction in dividend taxes increases firm valuation, particularly for high-dividend yield firms.

Similarly, Dhaliwal, Krull and Li (2005) studied three ex-ante measures of the implied cost of capital over a three-year period⁵, using methods developed by Gebhardt, Lee and Swaminathan (2001), Claus and Thomas (2001) and Gode and Mohanram (2003). All three of these models are a variation of the Feltham-Ohlson residual income model and use stock prices to calculate the implied cost of equity capital, but they each specify different assumptions about the factors that determine the growth rate of earnings in perpetuity. They find that in their sample group, the mean implied cost of equity capital fell by 1.47% from the effective date of the 2003 tax act, suggesting that the dividend tax cuts achieved their intended effect of lowering the cost of equity capital, and that dividend taxation affects firm valuation. A major weakness of their study, however, is that they do not really control for non-tax related events during their three-year study period. Furthermore, as Amronin *et al* (2008) note, a key assumption in Dhaliwal *et al*'s methodology is a stable equity risk premium throughout their period of study. During the three-year period that Dhaliwal *et al* study, however, the equity risk premium would have been influenced heavily by (1) a string of accounting scandals and the regulatory response these scandals generated, and (2) developments leading up to the US invasion of Iraq in March 2003. These non-tax events would have provided external shocks to the stock market.

To control for non-tax factors influencing the performance of the stock market, some economists have thus favored the event study approach, where stock market data from a narrow time period surrounding a key development is examined. Due to this short time horizon, event studies allow one to examine the effects of specific events in relative isolation. Event studies on financial events and literature on the methodology of event studies have been around since the

⁵ For six quarters before and after the passage of the 2003 Tax Act, i.e. 1 October 2001 to 30 September 2004

1980s (e.g. Brown and Warner, 1980 & 1985), and there is agreement within the field that event studies can provide reliable information when conducted correctly. Specifically, event study tests must correctly specify both (1) that the abnormal returns during the chosen event window are significantly different from zero, and (2) that the model used to find those cumulative abnormal returns is accurate (Kothari and Warner, 2004).

One such event study is Amronin *et al*'s (2008) research into the aggregate and cross-sectional effects of the dividend tax cut in 2003. They study two event windows when there was significant positive or negative information about the dividend tax cut. Their two event windows are (1) 3-9 January 2003 and (2) 14-28 May 2003. Window (1) captured the market reaction to the Washington Post announcement of the some details of President Bush's dividend tax cut plan, as well as Bush's speech on the plan at the Economics Club of Chicago. Window (2) tracked the passage and reconciliation of the tax cut bill through the chambers of Congress through its signing into law. Their choice of event windows coincides with those chosen by Auerbach and Hassett (2005), who study the effect of the dividend tax cuts on the value of the firm. Amronin *et al* find "little if any imprint of the dividend tax cut news on the value of the aggregate stock market," although, based on their findings, they attribute this more to portfolio reallocation from low-dividend to high-dividend stocks. From these results, they infer that the cost of equity capital does not fall, a leap in logic that is not well-supported throughout the rest of their paper. Nonetheless, their overall methodology seems sound, and I use a similar methodology to study the effects of the 2010 tax-related events on the stock market.

The effect of tax cuts on stock prices at the aggregate level also depends on whether the cuts were expected or unexpected, temporary or permanent. Gourio and Miao (2010) classify the 2003 JGTRRA as unexpected and temporary, given that there were sunset provisions built into

the bill and that the details of the bill that was ultimately passed were relatively uncertain until before May 2003. This view that the JGTRRA cuts were unexpected is further supported by other economists, including Auerbach and Hassett (2005) and Chetty, Rosenberg and Saez (2005). Gourio and Miao find that when tax cuts are permanent, “aggregate capital, investment, consumption, output, labor, and total factor productivity all increase in the steady state, [as do] aggregate dividend payments and equity issuance.” When tax cuts are unexpected and temporary, however, “the steady state does not change,” and “aggregate investment decreases and aggregate dividend payments increase during the periods when the tax cuts are implemented.”

At a cross-sectional level, studies on the 1993 and 2003 changes in dividend taxes in the US suggest that changes in rates of dividend taxation do affect share prices, and that the magnitude of change on share prices is influenced by dividend payout policy. Ayers, Cloyd and Robinson (2002), Amronin *et al* (2008) and Auerbach and Hassett (2005) all find that the share prices of high-dividend stocks increase (decrease) more than lower-dividend paying stocks when dividend taxes fall (rise).

Two other factors that affect cross-sectional performance are (1) the tax status of the marginal investor, (2) the relative rates of capital gains and dividend taxes. With regards to the former, logic suggests that firms with higher proportions of institutional holdings would be less affected by changes in the individual dividend tax rate, and thus face smaller price fluctuations when personal dividend tax rates change. Ayers *et al* (2002) demonstrate that this intuition is consistent with empirical evidence from the 1993 rise in dividend taxes.

Secondly, the relative capital gains and dividend tax rates also affect the impact on stock market prices, with relatively higher dividend tax rates discouraging dividend payouts (e.g.

Gourio and Miao, 2010; Chetty and Saez, 2005). In the US, capital gains are tax-advantaged because they are taxed only upon realization. In addition, from 1990 until 2003, capital gains faced a significantly lower tax rate than dividends⁶. For instance, Chetty and Saez (2005) find that the elimination of most of the tax benefits of capital gains relative to dividend payouts from the 2003 JGTRRA significantly increased dividend payments. The 2003 JGTRRA equalized capital gains and dividend tax rates for the first time since 1990 (Dhiwali *et al*, 2006).

Finally, one interesting finding in cross-sectional studies is that the 2003 dividend tax cuts seemed to benefit zero-dividend firms the most. Amronin *et al* (2008) find that the non-dividend paying firms gain larger cumulative abnormal returns than dividend-paying firms when the market learnt about the proposed dividend tax cuts, and Auerbach and Hassett (2005) find that the increase in firm value is largest for zero-dividend firms. Similarly, Dhaliwal, Krull and Li (2005) and Guenther, Jung and Williams (2005), who studied the effect of the tax cuts on the cost of equity capital, both find that after the 2003 tax cuts, the decrease in the cost of equity is larger for non-dividend paying firms than for dividend-paying firms. Amronin *et al* (2008) attribute this observation to a global spike in zero-dividend stock prices that is not related to tax effects.

Methodology

I develop my event study methodology based on that used by Amronin, Harrison and Sharpe (2008) to study the impact of the dividend tax cuts in 2003. Their fundamental strategy is to compare the change in value of a portfolio of US equities vis-à-vis that of a benchmark portfolio that would not have been similarly affected by US dividend tax policy. For instance, to

⁶ In 2003, long term capital gains taxes were reduced from a maximum of 20% to 15%; corresponding dividend taxes fell from 39.6% to 15%

calculate cumulative abnormal returns at an aggregate level, they compare the performance of the S&P 500 with that of the S&P Euro 350 and the Morgan Stanley Capital International index for Europe, Australasia and the Far East (MSCI EAFE).

One weakness in their methodology, however, is that instead of using the levels of the foreign indices, they used i-Share Exchange-Traded Funds (ETFs)⁷ as substitutes. While this might minimize problems with nonsynchronicity, the fact that these ETFs are traded in US markets increases the likelihood that they are owned and traded by US taxpayers. The ETFs are thus more likely to be affected by the US dividend tax cuts than the foreign indices they are based on. I alter their methodology in this aspect by using the values of the actual foreign indices, rather than their i-Share ETFs.

Choice of Event Windows

Event studies select event windows around significant information releases or developments in a situation. The complex political process surrounding the extension of the Bush tax cuts in 2010, however, is prone to information leakage and uncertainty about the ultimate passage of the bill. As such, I imitated the methodology put forth in Ayers *et al* (2002) and Amronin *et al* (2008) by choosing a short event window surrounding unexpected developments. I gauged the unexpectedness of a development by conducting a qualitative survey of newspaper articles in the Wall Street Journal, Washington Post and the New York Times. To get a quantitative measure of how much the tax cuts were on the public's mind, I also tracked the volume of articles in those three newspapers that mentioned the extension of the Bush tax cuts (see Figure 1). In addition, I also took note of the placement of the articles. Based on this

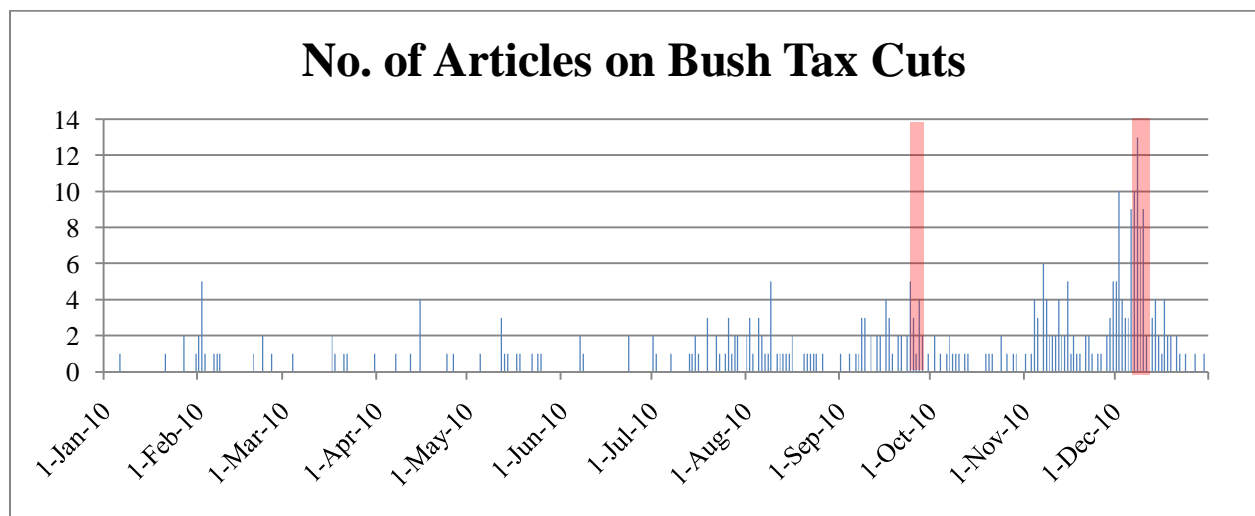
⁷ MSCI EAFE: EFA; S&P Euro 350: IEV

quantitative and qualitative examination, I selected the following event windows: (1) 20-24 September 2010 and (2) 3-8 December 2010.

Table 1: Key Events

Date	Event
18 Sep 2010, Sat	The Wall Street Journal reports in a front-page article that Nancy Pelosi is facing dissent from within her party about the tax cuts.
20 Sep 2010, Mon	The Washington Post reports that Democrats are “close to vote on tax cuts.”
22 Sep 2010, Wed	The New York Times reports that the vote on the tax cuts might be pushed to after the elections; Democratic congressional leaders plan to meet for lunch on Thursday, 23 September 2010, to discuss the cuts
23 Sep 2010, Thu	Democrats decide to push vote on tax cuts till after the elections.
6 Dec 2010, Mon— Morning	Newspapers report that the White House and Republicans are close to reaching an agreement on the tax cuts
6 Dec 2010, Mon— Evening	President Obama reaches a compromise with Republican leaders on the tax cuts.
7 Dec 2010, Tue	Significant news coverage, including front page reporting, on the compromise reached. Business analysts explicitly attribute the rise in the stock market to this event.

Figure 1: Volume of Newspaper Articles on the Bush Tax Cuts in 2010



**From the Wall Street Journal, Washington Post and New York Times*

The first event window represents a period where negative information was released regarding the extension of the tax cuts; the uncertainty was prolonged, and the possibility of the tax cuts expiring before a compromise was reached increased, since the negotiation window shrunk to the post-election months. The second event window represents a release of positive information since the bipartisan compromise increased the likelihood that the tax cuts would be extended.

When dividend tax rates are expected to rise, investors are willing to pay less for dividend-paying stocks than before because they expect lower post-tax dividend payouts under the higher taxes, thus causing the share prices of dividend-paying firms to fall. I expect that the price decrease will be larger for firms with higher dividend yields because the decrease in the value of post-tax dividends is largest for them.

To ensure that my event windows are not clouded by information other than news about the dividend tax cut, I also looked at the other major news topics during the event windows to see if they might have had an impact on stock performance. During the September event window, the other major news topics were the rallying of the Dow Jones Industrial Average (DJIA) and the 2010 midterm elections, with the Republicans releasing their “Pledge to America” on 23rd September 2010. With regards to the news about the DJIA, given that the DJIA and S&P 500 generally move in sync⁸, the gain in the DJIA could have mitigated the negative effect I expect to see during the September window. Although the focus on the midterm elections in the months leading up to November probably did cloud stock market performance, this influence is inevitable for any event window around that time period. Nonetheless, the decision by Democratic congressional leaders to delay the vote on the tax cuts until after the midterm

⁸ See Appendix A for a 6-month snapshot of the performance of the DJIA relative to the S&P 500

elections still garnered front-page coverage in the Wall Street Journal, and main-section coverage by the Washington Post and New York Times.

During the December event window, other than the tax cuts, the lackluster performance of the Treasuries market received significant news coverage. Business analysts, however, concluded the “plunge” in U.S. Treasury prices was partly “in response to President Barack Obama's proposal to extend tax cuts that could support economic growth in the short term but raise national debt levels longer term” (Magrowski, 2010) and partly due to investors being willing to invest in riskier assets. In addition, the business press also explicitly attributed the rise in the S&P 500 and the NASDAQ Composite Index to the tax compromise brokered between the White House and Republicans⁹, and the tax compromise received front-page coverage in the Wall Street Journal and the New York Times. This qualitative survey thus seems to indicate that the tax cuts were the primary news topic that would have affected the stock market during the event windows.

I thus expect that during the first event window (20-24 September 2010), stock prices, particularly those of the highest-dividend paying stocks, would have fallen. Conversely, I expect stock prices to rise in the latter event window (3-8 December 2010), and predict that this effect will be most pronounced amongst the stocks with the highest dividend yield.

Data & Findings

Aggregate Effects: US vs. Foreign Equity Indices

The foreign equity indices serve as benchmark portfolios to gauge market performance that is less affected by news about the Bush tax cuts. US investors, the individuals potentially

⁹ E.g. Bloomberg Businessweek reported on 7 December 2010, “Stocks pop after Obama, GOP agree on taxes”

affected if the tax cuts were not extended, hold a relatively small proportion of foreign stocks¹⁰. By comparing US equity indices to foreign equity indices, I would then be able to observe if there was an overall abnormal market reaction in the US during the event windows.

I obtained data on stock market index performance for both large- and small- cap indices from Yahoo Finance, MSCI and Bloomberg. Firms are considered to have large capitalizations (“large cap”) if their market capitalization (i.e. total market value of their equity) exceeds US\$10 billion. Examples of large cap firms include Microsoft, Exxon Mobil and Apple. I used the S&P 500 as the large cap equity index for the US, and compared its performance to that of the S&P Euro 350 and the MSCI EAFE¹¹. The S&P Euro 350 reflects equity market performance of seventeen major European markets, and covers 70% of Europe’s market capitalization. The MSCI EAFE captures equity performance in developed markets outside North America. It consists of stocks from twenty two different countries in Europe, Australasia and the Far East.

Firms are considered to have small capitalizations (“small cap”) if their market capitalization is less than US\$10 billion. For the baseline US performance, I used the Russell 2000 Index, which measures small-cap US equity. It is comprised of approximately 2,000 of the smallest securities, as determined by their market cap and current index membership. The Russell 2000 was compared to the Financial Times and London Stock Exchange (FTSE) Small Cap Index, which covers over 4,600 small cap stocks drawn from forty eight countries, and the MSCI World ex. USA SC Index, which captures small cap firm’s equity performance from developed countries excluding the US.

These data sources have been previously used by Amronin *et al* (2008) in their study of the effects of the dividend tax cuts in 2003, both when plans of the dividend tax cuts were first

¹⁰ Estimated at about 10-15% of European equity markets (Amronin *et al*, 2008)

¹¹ Morgan Stanley Capital International index for Europe, Australasia and the Far East

publicized, and later, when the plans were signed into law. The indices chosen are generally regarded as bell-weather for stock market performance in their respective regions. The data are also accurate, since they are publicly-available metrics of index performance and from reliable sources.

I compared the performance of the indices in two ways: firstly, by converting the equity indices' performance into a relative index, where the closing price on the eve of the key event is set as the baseline (i.e. index performance on the eve = 100). 20 September 2010 and 3 December 2010 are the baselines for the September and December event windows, respectively.

Figure 2: Large Cap Performance (September Event Window)

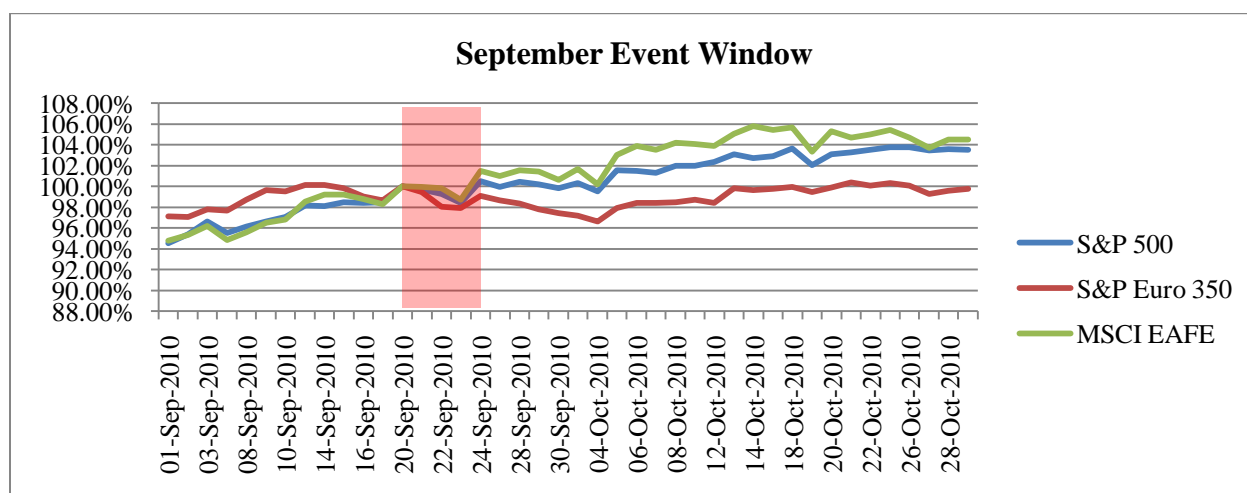


Figure 3: Large Cap Performance (December Event Window)

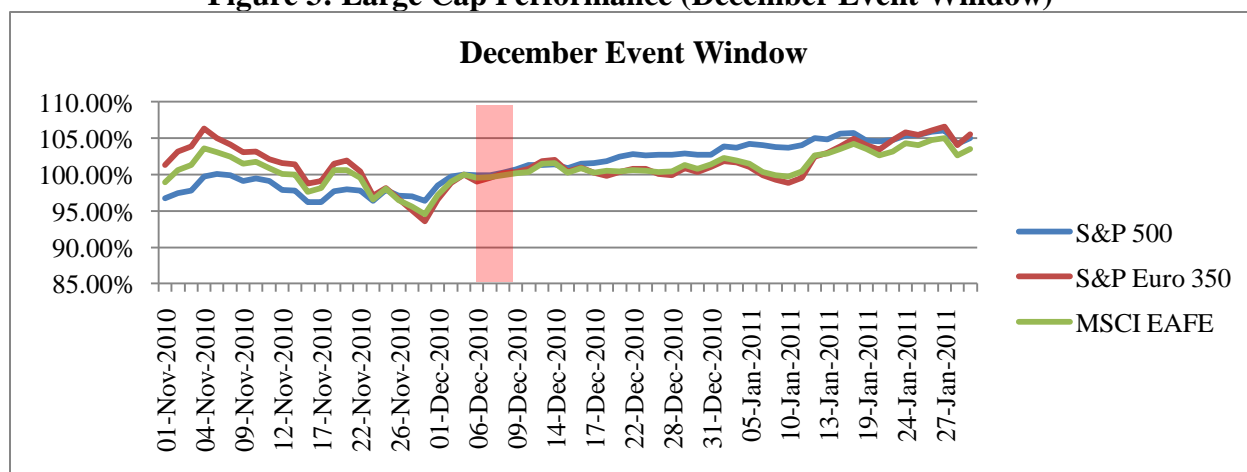


Figure 4: Small Cap Performance (September Event Window)

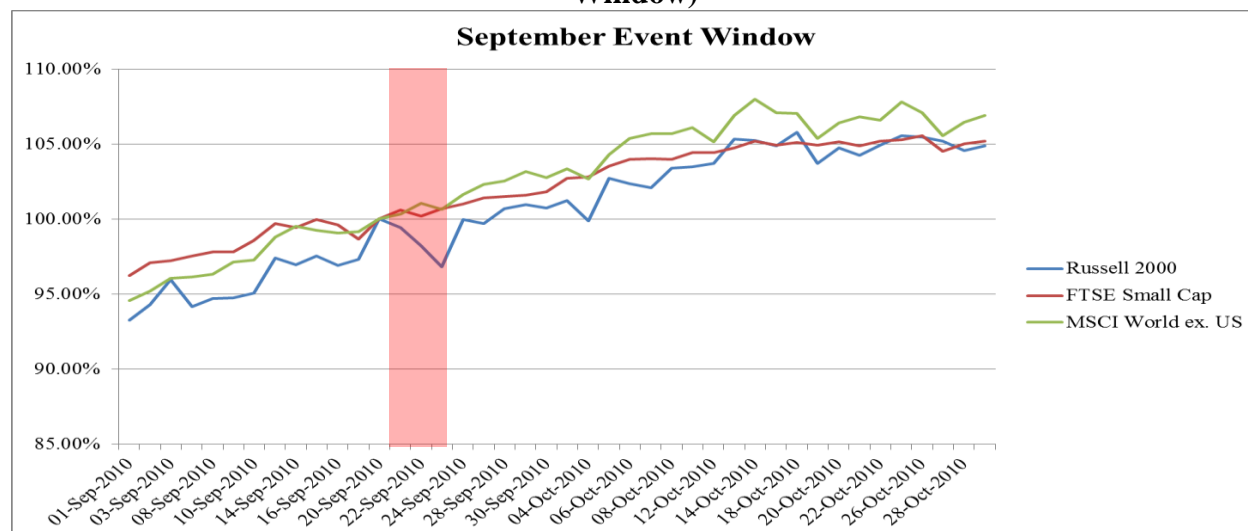
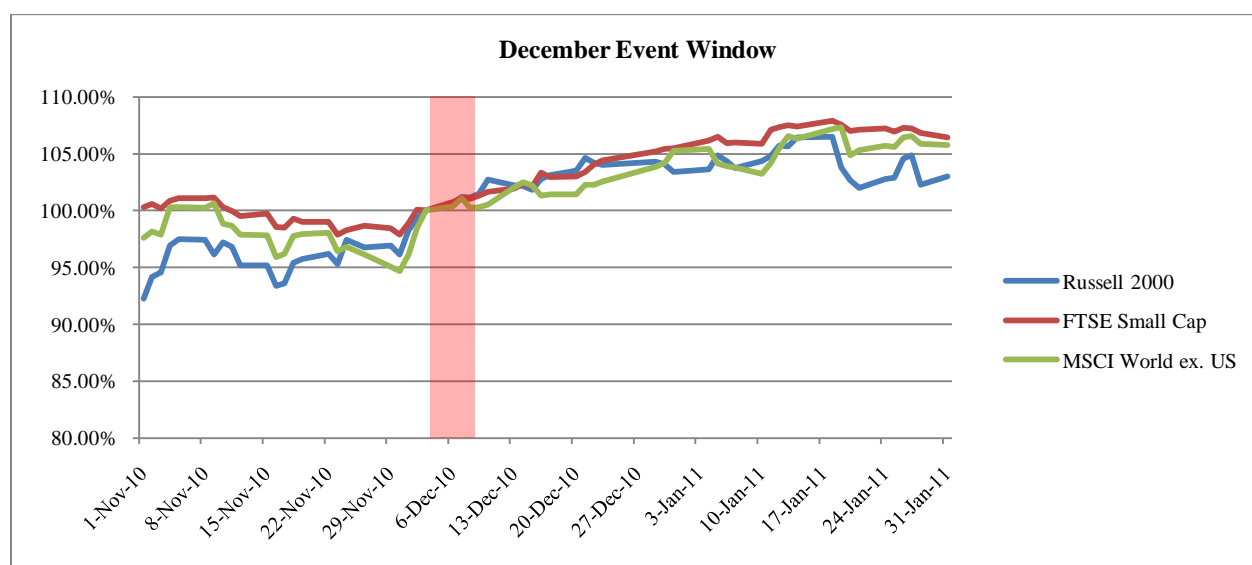


Figure 5: Small Cap Performance (December Event Window)



In addition, I also measured the difference in the holding period return of the US indices relative to the two benchmark indices. I used data from two estimation periods to find the historical and bootstrapped standard errors of this difference. The estimation period for the September event window was the 6-month period before the event window (March-August 2010), and for the latter, the 3-month period after December 2010 (January-March 2011). The

shorter duration of the second estimation period is due to the recent nature of the second event window. The results of the analysis are presented here:

Table 2: Cumulative Return Differences for US and Foreign Equities Indices

Panel A. S&P 500 versus S&P Euro 350 and MSCI EAFE				
Event Window	S&P 500 Less S&P Euro 350		S&P 500 Less MSCI EAFE	
	Sep 20-24	Dec 3-8	Sep 20-24	Dec 3-8
Differences in holding period returns (in percent)	-1.73%	0.14%	-0.98%	0.40%
Bootstrapped standard error of the difference	2.91%	1.25%	1.02%	1.14%
Historical standard error of the difference	2.89%	1.28%	1.03%	1.23%

Panel B. Russell 2000 versus FTSE Small Cap and MSCI World Ex. US Small Cap				
Event Window	Russell 2000 Less FTSE Small Cap		Russell 2000 Less MSCI World Ex. US Small Cap	
	Sep 20-24	Dec 3-8	Sep 20-24	Dec 3-8
Differences in holding period returns (in percent)	-1.04%	0.08%	-1.70%	0.91%
Bootstrapped standard error of the difference	2.16%	1.36%	1.72%	1.66%
Historical standard error of the difference	2.10%	1.41%	1.77%	1.74%

The differences in holding period returns are in the expected direction, with the US indices underperforming their foreign counterparts during the September event window and outperforming them in the December event window. This is consistent with findings from the changes in dividend tax rates in 1993 (Ayers *et al*, 2002) and 2003 (Amronin *et al*, 2008).

That being said, even the most significant difference, between the Russell 2000 and MSCI Small Cap index for the September window, is still less than the estimated standard errors. However, this lack of significant abnormal returns at the aggregate level is not completely unexpected. One possible explanation is the theory of portfolio reallocation put forth in Amronin *et al* (2008), where they theorized that investors could have reallocated their investment portfolios from high- to low- dividend stocks in reaction to a potential rise in dividend taxes (such as the September event window), and vice versa when faced with a cut in dividend taxes (such as the December event window). I thus test this hypothesis by examining the cross-sectional performance of US stocks during the event windows.

Cross-Sectional Effects

I accessed Compustat, Center for Research in Security Prices (CRSP) and Compustat-CRSP data via the University of Pennsylvania's Wharton Research Data Service (WRDS), and filtered the data to select actively-traded US equities¹². I then excluded Real Estate Investment Trusts (REITs), since REITs enjoy corporate tax breaks as long as they distribute a minimum of 90% of their taxable income to investors¹³ (IRS, 2011). REITs would thus not be affected by either the termination or extension of the 2003 Bush tax cuts. This resulted in a sample of 3627 firms. The data used is from fiscal year 2009.

I then separated the firms into portfolios based on their 2009 dividend yield. Just under 60% of the firms (2173 firms) were zero-dividend firms. Of the remaining 40%, the top quartile (363 firms) based on dividend yield were classified as "High-dividend", the bottom quartile (363 firms) "Low-dividend" and the middle 50% (728 firms) "Medium-dividend." Select

¹² The CRSP dataset classifies stocks as either "active" or "inactive;" in choosing my dataset, I only checked the box for "actively traded"

¹³ IRS guidelines on REITs: <http://www.irs.gov/instructions/i1120rei/ch01.html>

characteristics of the firms in the various portfolios reflect that the high-dividend firms tend to be relatively small compared to the medium- and low- dividend firms.

Table 3: Firm Characteristics by Dividend Portfolio

Firm Characteristics by Dividend Yield Portfolio									
Portfolio	Number of Firms	Median				Mean			
		Dividend Yield	Total Assets (Mil)	LT Debt/Assets	PPE/Assets	Dividend Yield	Total Assets (Mil)	LT Debt/Assets	PPE/Assets
Zero-div	2173	0.00%	339.825	5.85%	11.61%	0.00%	6178.766318	15.85%	21.94%
Low-div	363	0.76%	2358.894	11.28%	18.21%	2.79%	40327.89392	15.09%	25.57%
Med-div	728	2.69%	2935.182	12.37%	12.98%	0.76%	24225.00214	16.17%	23.23%
High-div	363	6.41%	1391.2015	16.00%	12.24%	8.15%	27145.7031	23.02%	28.86%

I also calculated the estimated factor loadings of the portfolios using the March to August 2010 estimation period. The factor loadings were calculated by regressing the portfolio returns on the single market factor ($R_m - R_f$), as well as the Fama-French factors, according to the following equations:

$$r_i = r_f + \beta^{\text{MKT}} (r_m - r_f) + \varepsilon_i \quad \text{--- (1a)}$$

$$r_i = r_f + \beta^{\text{MKT}} (r_m - r_f) + \beta^{\text{SMB}} (r_S - r_B) + \beta^{\text{HML}} (r_H - r_L) + \varepsilon_i \quad \text{--- (2b)}$$

The Fama-French equation, equation (2), uses the following shorthand:

- SMB: “Small Minus Big;” measures the return differences of a portfolio of small-cap versus large cap stocks
- HML: “High Minus Low;” measure the return differences of a portfolio of stocks with high book-to-market ratios versus that with low book-to-market ratios

R_m was taken to be the daily return of the S&P 500, and R_f the rate which would give the one-month T-bill rate when compounded for a month. The Fama-French factors were not available

for March 2011, so I did not calculate a similar regression to find the factor loadings for the latter estimation period.

Table 4: Estimated Factor Loadings

Estimated Factor Loadings, by Dividend Yield Portfolio					
Portfolio	Number of Firms	Equal-Weighted Portfolios			
		Market β^{MKT}	Fama-French		
			β^{MKT}	β^{SMB}	β^{HML}
Zero-div	2173	1.07	0.863	0.541	0.171
Low-div	363	1.18	0.995	0.300	0.243
Med-div	728	1.06	0.950	0.274	0.035
High-div	363	0.84	0.732	0.190	0.127

The estimated factor loadings are consistent with those found in Amronin *et al* (2008), with β being somewhat inversely related to the dividend yield of the portfolio. However, where Amronin *et al*'s factor loadings were all less than one, my factor loadings for all but the high-dividend portfolio are greater than one.

The next step I took was to calculate the cumulative return on each of the portfolios over the event windows. I used the estimated factor loadings from Table 4 to calculate cumulative abnormal returns, α_i , according to the following equations:

$$\alpha_i^{\text{M}} = (r_i - r_f) - \hat{\beta}_i^{\text{MKT}} (r_m - r_f) \quad \text{--- (2a)}$$

$$\alpha_i^{\text{FF}} = (r_i - r_f) - \hat{\beta}_i^{\text{MKT}} (r_m - r_f) - \hat{\beta}_i^{\text{SMB}} (r_S - r_B) - \hat{\beta}_i^{\text{HML}} (r_H - r_L) \quad \text{--- (2b)}$$

Item (3) in Table 5, the CAR Standard Error, was calculated by taking the standard deviation of the 3- or 4- trading-day¹⁴ CAR during the estimation period.

¹⁴ 3 trading days' CAR to estimate the CAR S.E. for the December event window, and 4 trading days' CAR for the September event window

Table 5: Cumulative Abnormal Returns by Dividend Portfolio—Single Factor Model

Portfolio	(1) Cumulative Return	(2) CAR	(3) CAR Standard Deviation
Panel A. September Event Window (Sep. 20-24, 2010)			
Zero-div	0.86%	0.19%	1.03%
Low-div	0.24%	-0.49%	1.02%
Medium-div	0.22%	-0.45%	0.61%
High-div	0.21%	-0.35%	0.95%
Panel B. December Event Window (Dec. 3-8, 2010)			
Zero-div	0.45%	0.13%	0.86%
Low-div	0.32%	-0.03%	0.83%
Medium-div	0.46%	0.15%	0.52%
High-div	0.28%	0.03%	0.78%

Table 6: Cumulative Abnormal Returns by Dividend Portfolio—Fama-French

Portfolio	(1) Cumulative Return	(2) CAR	(3) CAR Standard Deviation
Panel A. September Event Window (Sep. 20-24, 2010)			
Zero-div	0.86%	-1.60%	2.87%
Low-div	0.24%	-2.30%	2.60%
Medium-div	0.22%	-2.10%	2.52%
High-div	0.21%	-1.61%	2.17%
Panel B. December Event Window (Dec. 3-8, 2010)			
Zero-div	0.45%	0.45%	2.38%
Low-div	0.32%	0.16%	2.22%
Medium-div	0.46%	0.41%	2.10%
High-div	0.28%	0.18%	1.82%

The results in the September event window are consistent with my hypothesis, with the dividend yield of the portfolio inversely relating to the strength of performance, and the CARs in both event windows being in the expected directions. This result is consistent with the initial

hypothesis that stocks with the highest dividend yields would be subject to the largest penalty if dividend taxes were to rise, and thus suffer the most during the September event window. These results, however, are not supported by the CARs. This could be due to the factor loadings for the high-dividend portfolio (Table 4) being less than one, while that of the other three portfolios was greater than one.

The returns for the December event window are more puzzling than that of the September event window. Excluding the zero-dividend stocks, which did not perform as expected in the studies of the 2003 dividend tax cut, the high-dividend stocks still perform more poorly than expected. Instead of being the portfolio with the largest returns and CAR, the high-dividend portfolio has the lowest cumulative return and a CAR much lower than that of the medium-dividend portfolio. This, however, could be due to the shorter duration of the dividend tax cuts in 2010. In 2003, the lower dividend tax rates would have been effective for five years, while in 2010, they were only extended for two years. In addition, investors might still have been wary of investing in smaller, high-risk, high-dividend firms in the wake of the 2007 financial crisis.

The consistent strong performance of the zero-dividend portfolio is an unexpected result that was also observed across-the-board in studies of the initial implementation of the 2003 tax cuts. While it is beyond the scope of this paper to fully explain this result, this observation could reflect the underlying quality and high-growth potential of zero-dividend firms. After all, by not paying a dividend, such firms signal that all investment earnings have productive purposes through reinvestment. Particularly in a post-crisis period such as 2010, investors might seek to purchase equity stakes in such firms to ensure more sustained growth. In addition, the constancy of this observation in both 2003 and 2010 suggests that there are significant factors influencing

the performance of zero-dividend stocks that are still not well-understood and thus should be further researched.

Finally, none of the CAR results are statistically significant, and amongst these, the medium-dividend portfolio has the most significant results. This lack of statistically significant results is similar to that found by Amronin *et al* (2008), although their two significant CAR results were for the high-dividend portfolio, which thus provides stronger support for the hypothesis of portfolio reallocation. In the context of this study, however, significant CARs on the high-dividend portfolio are precluded by their unexpectedly poor performance, which, as mentioned above, could be due to the shorter duration of the dividend tax-cut and greater risk-aversion amongst investors in a post-crisis environment.

Conclusion

I investigate the effect of the possible expiration and eventual extension of the dividend tax cut on US stock market performance in 2010. I compare aggregate performance of US common stocks relative to foreign stocks using bell-weather equity indices, and examine cross-sectional performance amongst US stocks by creating different stock portfolios based on their dividend yield. This comparison is done over two event windows, (1) 20-24 September 2010 and (2) 3-8 December 2010.

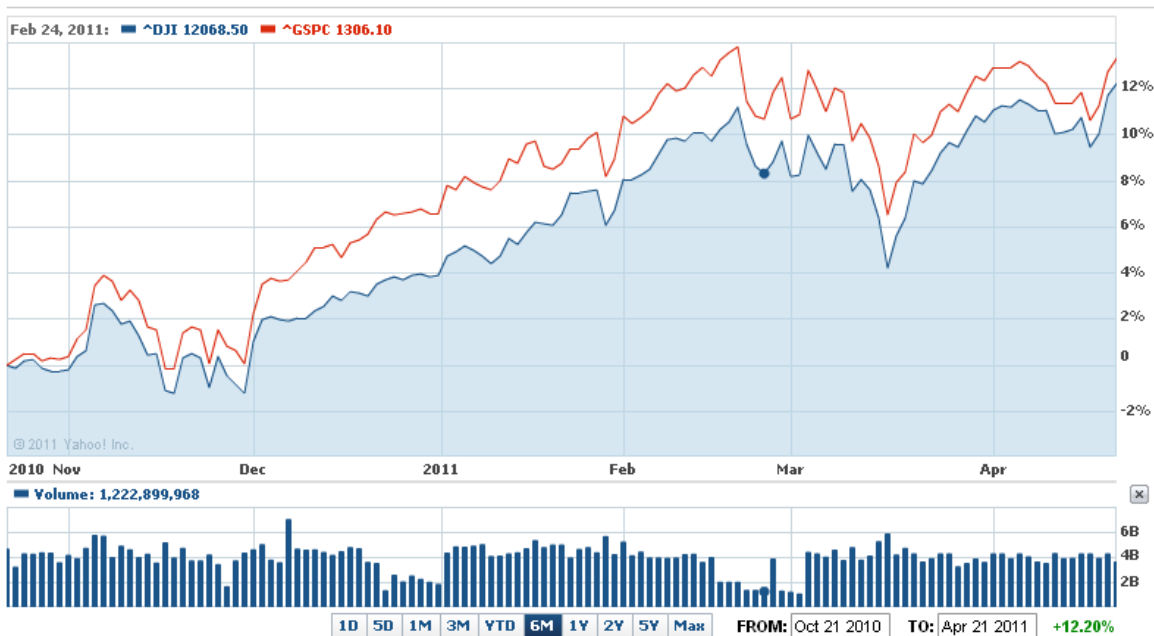
Consistent with previous studies, I find that the US stock market did respond to negative and positive news on the extension of the Bush-era dividend tax cuts, with stock prices falling and rising, respectively. Although the aggregate level reaction was not statistically significant, this could be due to portfolio redistribution by investors. This theory of portfolio redistribution is

supported to a limited extent by cross-sectional performance, with the dividend yield being inversely related to cumulative returns in the September event window.

These findings, however, are not always consistent with the CAR, and the CARs lack statistical significance. This suggests that more research should be done on these events, possibly further in the future from these event windows so as to ensure a more accurate estimation period that straddles both event windows. Such research would be highly relevant to the debate that will arise in 2012 when the dividend tax cuts are set to expire.

Appendices

Appendix A: Snapshot of DJIA performance relative to S&P 500 performance over 6-months (November 2010- April 2011)



Source: Yahoo Finance

DJI: Dow Jones Industrial Average

GSPC: S&P 500 Index

Bibliography

- AFP. "Expiring Tax Cuts Pose Dilemma for US Lawmakers." *Channel News Asia* (accessed 3/9/2011).
- Amromin, G., P. Harrison, and S. Sharpe. "How did the 2003 Dividend Tax Cut Affect Stock Prices?" *Financial Management* 37, no. 4 (Winter, 2008): 625, <http://proquest.umi.com/pqdweb?did=1622305841&Fmt=7&clientId=42799&RQT=309&VName=PQD>.
- Arends, Brett. "What would Happen if the Bush Tax Cuts Expire." <http://online.wsj.com/article/SB10001424052748703977004575393483572603148.html> (accessed 3/2/2011, 2011).
- Auerbach, Alan J. and Kevin A. Hassett. "The 2003 Dividend Tax Cuts and the Value of the Firm: An Event Study." *National Bureau of Economic Research Working Paper Series* No. 11449 (July 2005, 2005), <http://www.nber.org/papers/w11449>; <http://www.nber.org/papers/w11449.pdf>.
- Ayers, Benjamin C., C. Bryan Cloyd, and John R. Robinson. "The Effect of Shareholder-Level Dividend Taxes on Stock Prices: Evidence from the Revenue Reconciliation Act of 1993." *The Accounting Review* 77, no. 4 (Oct., 2002): pp. 933-947, <http://www.jstor.org/stable/3068877>.
- Booth, L. D. and D. J. Johnston. "The Ex-Dividend Day Behavior of Canadian Stock Prices: Tax Changes and Clientele Effects." *The Journal of Finance* 39, no. 2 (Jun., 1984): pp. 457-476, <http://www.jstor.org/stable/2327871>.
- Brown, Carrie Budoff. "Obama, GOP Reach Tax-Cut Deal." (accessed 4/21/2011).
- Chetty, Raj, Joseph Rosenberg, and Emmanuel Saez. "The Effects of Taxes on Market Responses to Dividend Announcements and Payments: What can we Learn from the 2003 Dividend Tax Cut?" *National Bureau of Economic Research Working Paper Series* No. 11452 (July 2005, 2005), <http://www.nber.org/papers/w11452>; <http://www.nber.org/papers/w11452.pdf>.
- Chetty, Raj and Emmanuel Saez. "Dividend Taxes and Corporate Behavior: Evidence from the 2003 Dividend Tax Cut." *The Quarterly Journal of Economics* 120, no. 3 (Aug., 2005): pp. 791-833, <http://www.jstor.org/stable/25098756>.
- Claus, James and Jacob Thomas. "Equity Premia as Low as Three Percent? Evidence from Analysts' Earnings Forecasts for Domestic and International Stock Markets." *The Journal of Finance* 56, no. 5 (Oct., 2001): pp. 1629-1666, <http://www.jstor.org/stable/2697733>.
- Bill Summary & Status - 111th Congress (2009 - 2010) - H.R.4853*. 2011. 4/21/2011. no. <http://thomas.loc.gov/cgi-bin/bdquery/z?d111:HR04853:@@D&summ2=m&TOM:/bss/d111query.html>, (): (accessed 4/21/2011).
- Cutter, Chip. "Stocks Pare Losses on Hopes of Compromise on Taxes." (accessed 4/22/2011).
- . "Stocks Pop After Obama, GOP Agree on Taxes." (accessed 4/22/2011).
- Denning, Liam. "A Cloudy Future Pays Dividends." *Wall Street Journal*, Sep 25, 2010. B.14, <http://proquest.umi.com/pqdweb?did=2146130451&Fmt=7&clientId=42799&RQT=309&VName=PQD>.
- Dhaliwal, Dan S., Linda K. Krull, and Oliver Z. Li. "Did the 2003 Tax Act Reduce the Cost of Equity Capital?" *SSRN eLibrary* (2006), <http://ssrn.com/paper=741327>.

- Dhaliwal, Dan S., Linda K. Krull, Oliver Z. Li, and William J. Moser. "Dividend Taxes and Implied Cost of Equity Capital." *SSRN eLibrary* (2004), <http://ssrn.com/paper=463083>.
- Dixon, Kim. "Analysis: Outlook for U.S. Dividend Taxes Looks Brighter." *Reuters*, 12 Nov 2010, 2010. (accessed 3/9/2011).
- Donmoyer, Ryan J. and Cohn, Peter. "Congress Passes \$858 Billion Tax-Cut Extension Plan." *Businessweek*. <http://www.businessweek.com/news/2010-12-22/congress-passes-858-billion-tax-cut-extension-plan.html> (accessed 3/2/2011, 2011).
- Feltham, Gerald A. and James A. Ohlson. "Valuation and Clean Surplus Accounting for Operating and Fin." *Contemporary Accounting Research* 11, no. 2 (Spring, 1995): 689, <http://proquest.umi.com/pqdweb?did=12114345&Fmt=7&clientId=42799&RQT=309&VName=PQD>.
- FTSE. "FTSE Global Small Cap Index Series." http://www.ftse.com/Indices/FTSE_Global_Small_Cap_Index_Series/index.jsp (accessed 3/16/2011, 2011).
- Gebhardt, William R., Charles M. C. Lee, and Bhaskaran Swaminathan. "Toward an Implied Cost of Capital." *Journal of Accounting Research* 39, no. 1 (Jun, 2001): 135, <http://proquest.umi.com/pqdweb?did=84806380&Fmt=7&clientId=42799&RQT=309&VName=PQD>.
- Gode, Dan and Partha Mohanram. "Inferring the Cost of Capital using the Ohlson-Juettner Model." *Review of Accounting Studies* 8, no. 4 (Dec, 2003): 399, <http://proquest.umi.com/pqdweb?did=439273221&Fmt=7&clientId=42799&RQT=309&VName=PQD>.
- Gourio, F. and J. Miao. "Transitional Dynamics of Dividend and Capital Gains Tax Cuts." *Review of Economic Dynamics* 14, no. 2 (Apr, 2011): 368, <http://proquest.umi.com/pqdweb?did=2303879221&Fmt=7&clientId=42799&RQT=309&VName=PQD>.
- Guenther, D. A., B. Jung, and M. Williams. "The Effect of the 2003 Dividend Tax Rate Reduction on Corporations' Cost of Equity Capital." Working paper, , http://www.business.illinois.edu/accountancy/events/symposium/tax/proceedings/proceedings_2005/Guenther.pdf.
- Hall, Glenn. "Democrat Tax Dodge Changes Nothing." , 24 Sept 2010, (accessed 3/9/2011).
- Hassett, Kevin. *Stock Returns Imperiled by Pay-as-I-Say Obama*. <http://www.businessweek.com/news/2010-04-11/stock-returns-imperiled-by-pay-as-i-say-obama-kevin-hassett.html> ed. Vol. 2011 (accessed 3/9/2011).
- Herszenhorn, David M. "Debate on Tax Cuts may be Delayed." (accessed 4/22/2011).
- Hook, Janet and John D. McKinnon. "Congress Passes Tax Deal --- Divided Legislature Adopts Sweeping Measure to Avert Increases, Add New Breaks." *Wall Street Journal*, Dec 17, 2010. A.1, <http://proquest.umi.com/pqdweb?did=2215052731&Fmt=7&clientId=42799&RQT=309&VName=PQD>.
- Joint Committee on Taxation, The. *General Explanation of Tax Legislation Enacted in the 108th Congress*. Washington, D.C.: The Joint Committee on Taxation, 2005.
- Kothari, S. P. and Jerold B. Warner. "The Econometrics of Event Studies." *SSRN eLibrary* (2004), <http://ssrn.com/paper=608601>.
- Lorie, James H. "A Particularly Unhappy Anniversary." *Journal of Portfolio Management* 6, no. 1 (Fall, 1979): 42,

- <http://proquest.umi.com/pqdweb?did=7657045&Fmt=7&clientId=42799&RQT=309&VName=PQD>.
- Magnowski, Daniel. "Global Markets-U.S. Bonds Extend Selloff, Yields Boost Dollar." *Reuters*, 8 December 2010, 2010. ,
<http://af.reuters.com/article/metalsNews/idAFL3E6N80FG20101208> (accessed 22 April 2011).
- McKinnon, John D. "Positions Harden on Tax Cuts; Boehner's Hint at Possible Compromise on Bush-Era Rates Doesn't Gain Traction." *Wall Street Journal (Online)*, Sep 14, 2010. ,
<http://proquest.umi.com/pqdweb?did=2136993301&Fmt=7&clientId=42799&RQT=309&VName=PQD>.
- McKinnon, John D., Ben Levisohn, and Justin Lahart. "U.S. News: Tax Unknowns Drive Business Moves." *Wall Street Journal*, Sep 13, 2010. A.4,
<http://proquest.umi.com/pqdweb?did=2136291541&Fmt=7&clientId=42799&RQT=309&VName=PQD>.
- Mitchell, Mark L. and Jeffrey M. Netter. "Triggering the 1987 Stock Market Crash : Antitakeover Provisions in the Proposed House Ways and Means Tax Bill?" *Journal of Financial Economics* 24, no. 1 (9, 1989): 37-68.
- Mollenkamp, Carrick, Gregory Zuckerman, and Laura Saunders. "Dividend Rock: Firms Reward Buyout Bosses." *Wall Street Journal*, Oct 14, 2010. C.1,
<http://proquest.umi.com/pqdweb?did=2161778361&Fmt=7&clientId=42799&RQT=309&VName=PQD>.
- MSCI. "Index Definitions - International Equity Indices."
http://www.msibarra.com/products/indices/international_equity_indices/definitions.html#EAFE (accessed 3/16/2011, 2011).
- Raju, Manu. "Dems may Punt on Bush Tax Cuts." *Politico* 2010. (accessed 3/8/2011).
- Russell Investments. "Russell 2000® Index."
http://www.russell.com/indexes/data/fact_sheets/us/russell_2000_index.asp (accessed 3/16/2011, 2011).
- S&P. "S&P Europe 350." <http://www.standardandpoors.com/indices/sp-europe-350/en/us/?indexId=speur-350-eurff--p-reu---> (accessed 3/16/2011, 2011).
- Saunders, Laura. "'Consumers are Paralyzed' Over Tax Doubt." *Wall Street Journal (Online)*, Sep 23, 2010. ,
<http://proquest.umi.com/pqdweb?did=2145086761&Fmt=7&clientId=42799&RQT=309&VName=PQD>.
- Sikora, J. "Scheduled Sunset of Reduced Capital Gain and Dividend Tax Rates-Back to the Future (Or Not?)." *Journal of Taxation* 113, no. 5 (Nov, 2010): 262,
<http://proquest.umi.com/pqdweb?did=2206200421&Fmt=7&clientId=42799&RQT=309&VName=PQD>.
- Sloan, Allan. "Letting the Bush Tax Cuts Expire Won't Traumatize the Stock Market." *Fortune*, 09/06, 2010. 63,
<http://search.ebscohost.com/login.aspx?direct=true&db=buh&AN=53165911&site=ehost-live>.
- Smith, J. and D. Maloney. "Planning for Capital Gains and Losses in an Uncertain Environment." *Practical Tax Strategies* 85, no. 4 (Oct, 2010): 164,
<http://proquest.umi.com/pqdweb?did=2185853651&Fmt=7&clientId=42799&RQT=309&VName=PQD>.

- Strauss, L. "It's Not Time to Abandon Stocks." *Barron's* 90, no. 36 (Sep 6, 2010): 36,
<http://proquest.umi.com/pqdweb?did=2136873631&Fmt=7&clientId=42799&RQT=309&VName=PQD>.
- The Pak Banker. "US House Democrats Reject Tax Plan." *The Pak Banker*, Dec 10, 2010. ,
<http://proquest.umi.com/pqdweb?did=2208727901&Fmt=7&clientId=42799&RQT=309&VName=PQD>.
- Vaughan, Martin. "Geithner: Congress should Hold Top Dividend Tax Rate at 20%." *Automated Trader*, 8 Jul 2010, 2010. (accessed 3/9/2011).
- Winkler, Rolfe and Laura Saunders. "Taxing Times for U.S. Investors." *Wall Street Journal*, Aug 26, 2010. C.12,
<http://proquest.umi.com/pqdweb?did=2120091631&Fmt=7&clientId=42799&RQT=309&VName=PQD>.