DISSERTATION

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STOCK BUYBACK ANNOUNCEMENTS:

AN EXAMINATION OF ABNORMAL RETURNS IN

STOCK PRICE & CREDIT DEFAULT SWAPS FOR S&P100 COMPANIES

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ABSTRACT

This event study examines the short-run effect of stock buyback announcements on stock price and credit default swaps (CDS) exclusively for mega capitalization S&P100 companies. The research sample consists of 53 S&P100 companies and includes 133 buyback announcement events occurring between September 2011 and May 2018. The study utilizes the market model to estimate expected returns and to compute abnormal returns (AR) for equity and abnormal change (AC) in CDS. Based on an initial analysis, it's determined that there is a statistically significant AR and cumulative AR for stock price, as well as a significant AC in CDS, on a buyback announcement date. Regarding share price, AR and cumulative AR were further tested for significance against an array of firm-specific control variables for the event date and subsequent days. Additionally, robustness tests were employed. All results demonstrate that stock buyback announcements are significantly correlated with AR in stock price. As for CDS, an identical research process was conducted. However, while there is also preliminary evidence that stock buyback announcements have an impact on CDS on the event date, the results are less conclusive when assessing the AC and cumulative AC against control variables. Throughout the paper, all data and research findings will be discussed, along with a comprehensive literature review. Finally, conclusions will be drawn, and interpretations offered.

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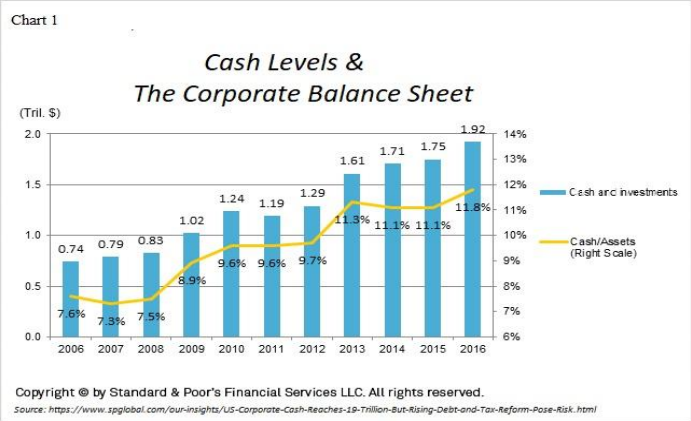
1.0 INTRODUCTION

Stock buybacks are an extremely important component of corporate finance, as they are rendered an approach for firms to enhance shareholder wealth. In theory, if a stock buyback is announced, shareholders should be willing to pay more for the equity of the respective corporation, since a repurchase will reduce the number of shares available in the marketplace. However, it is critical to test whether this theorized market reaction can be observed in reality. In this paper, the stock prices and credit default swaps of mega capitalization firms, listed in the S&P 100, were analyzed to determine if abnormal behavior exists in those marketplaces following a stock buyback announcement. The hypotheses were tested via an event study, utilizing the market model for both equity and credit default swaps. Data for 133 stock buyback announcement events were collected and analyzed against an array of control variables in both univariate and multivariate regression models. The research findings will be presented throughout this paper.

Since the end of the 2007-09 financial crisis, U.S. corporations have seen a rapid increase in their cash holdings on the balance sheet (see Chart 1). This occurrence has been particularly strong in the technology sector. Currently, this industry holds approximately "46% of the total cash on hand by U.S. companies."[1] Accordingly, as cash levels have risen, shareholders have been seeking greater returns on their investments. These yields typically result from either stock price appreciation or a dividend distribution. Although dividends can offer a steady stream of income to investors, they face the issue of "double taxation."[2] Yet, the double taxation problem has been somewhat mitigated due to tax cut legislation implemented by the Bush Administration in the early-2000s (and made mostly permanent by the Obama and Trump Administrations). The

[1] Davis, M. (2016, May 20). Retrieved on June 16, 2018 from www.bloomberg.com/news/articles/2016-05-
[2] Bettner, M., Carcello, J., Haka, S., Williams, J. (2015). p. 486.

tax law amendment implemented the concept of "qualified dividends," which always result in a lower tax burden than an "ordinary dividend."[3] A dividend can only be considered qualified if it has been paid by a U.S. corporation or a qualified foreign corporation and the stock is held for more than one year by the owner.[4] However, unless an individual is in the lowest possible tax bracket, they will still face some individual income taxes on any dividend income, whether it is rendered qualified or ordinary.[5] Thus, corporations have been seeking additional approaches to provide substantial returns to investors.



As an alternative (or complement) to paying dividends, many firms have vastly expanded share buyback activity. While the level of share repurchases has rapidly accelerated in recent years, they started to become very popular as early as the 1990s. According to Bradford (2008), "during the 1990s, cash distributed through a buyback exceeded cash dividend payouts for the first time."[6]

[3] Lazo, S. (2003). p. 40.
[4] IRS. (2017). Qualified Dividends. Retrieved on June 11, 2018 from https://www.irs.gov/publications/p550#en_US_2017_publink100010075
[5] Internal Revenue Service. Chapter 8. Retrieved on June 3, 2018 from https://www.irs.gov/publications/p17/ch08.html
[6] Bradford, B. (2008). p. 45.

Although the aim of a stock buyback should be to boost shareholder wealth, there are some significant accounting differences when compared to a dividend. Firstly, a stock buyback does not result in the double taxation problem. Hypothetically, if a share repurchase resulted in an increase in the stock price, the investor would not be taxed on the gain until the stock is actually sold. Depending on one's tax bracket, the capital gain tax may be lower than the dividend tax rate, especially if the dividend is taxed as an ordinary dividend. Secondly, while a stock repurchase does reduce stockholders' equity via increasing treasury stock, it does not result in a reduction in a corporation's retained earnings. Accordingly, a firm can continue to legally pay sizable dividends if they choose.

One of the key reasons why a firm would want to buy back its own stock is to reduce the number of shares outstanding in the open market. As the share count declines, earnings per share (EPS) should correspondingly improve, assuming the firm is profitable.[7] Conceptually, if EPS increases, ceteris paribus, the market value of the underlying stock should also be enhanced. However, this may not necessarily be the case, especially if the shares are being repurchased as part of an "earnings management" strategy. An earnings management strategy occurs when companies attempt to boost their EPS artificially to meet Wall Street estimates.[8] In this scenario, an entity may be facing declining net income, but EPS remains stable or can *increase* due to a rapid decline in the share count. Thus, the market may not necessarily view this as a positive signal.[9]

Although providing support to the stock price and boosting shareholder wealth may be considered as one of the chief reasons why a stock buyback plan is implemented, firms can be

[7] Kieso, D., Weygandt, J., and Warfield, T. (2014). p. 830.
[8] Hribar,P., Jenkins, N., and Johnson, B. (2004). p. 1.
[9] Yallapragada, R. (2014). p. 196.

motivated to repurchase stock for a multitude of other reasons. For instance, a stock buyback program may be essential for a company to meet its employee stock option requirements. However, unlike a true buyback, shares outstanding may not be technically reduced over the longer-term (although there can be some near-term reductions). These shares are merely "recycled" and, later, reappear in the open market.[10] Other factors could also include preventing a hostile takeover or meeting merger needs. In all these cases, a stock buyback may not necessarily result in an overall increase in shareholder wealth.[11]

In addition, there are different approaches that a firm can take with a stock repurchase. There are two primary types of stock buyback programs: open-market stock repurchase agreement and an accelerated stock repurchase program. In an open-market stock repurchase program, the corporation buys shares directly from the market. This is much more typical and is usually executed over several years. Yet, a drawback of this approach, for shareholders, is that a corporation is not legally required to implement the announced plan.[12]

On the other hand, according to Michel, Oded, and Shaked (2010), unlike a general promise to repurchase stock in the open market, an accelerated stock repurchase is legally binding.[13] In order to be executed, an "investment bank acts as an intermediary, borrows shares from the marketplace, and subsequently, sells the stock back to the company."[14] Shares are promptly removed from the market, and the effect on the price may be more powerful.

Though a corporation's board of directors may intend to positively influence the stock price by announcing a buyback, it is essential to determine if this is the case. Besides the impact

[10] Kieso, D., Weygandt, J., and Warfield, T. (2014). p. 831.
[11] *Ibid,* p. 830.
[12] Yallapragada, R. (2014). p. 196.
[13] Michel, A., Oded, J., Shaked I. (2014). p. 56.
[14] *Ibid.*

on stock price, it is important to consider the effect on a firm's debt, as well. The influence on debt can be derived in two different ways. First, if an entity decided to borrow funds to finance stock acquisitions, this can cause a material change in the respective entity's capital structure. Thus, the proportion of debt to equity can rise substantially on the balance sheet. Second, if a stock repurchase is financed internally, both assets and equity will decline through the use of cash and the increase in the contra equity account, treasury stock, respectively. As a result, the percentage of liabilities in the capital structure will increase even if absolute debt levels remain unchanged.

However, this area is more complicated to investigate since many corporations have a multitude of bond issues outstanding. Different bonds have diverse par values, maturity dates, liquidity, coupon rates, and covenants. Due to these discrepant factors, no single bond may behave in a similar manner following a corporate event, and thus, this can skew the interpretation of results. As an alternative, a firm's credit default swap (CDS) can be analyzed. A CDS is essentially comparable to an insurance contract on an entity's aggregate debt. Hence, it is likely a more efficient metric to assess any perceived impact on the firm's total credit. Further description of a CDS will be presented in the upcoming section.

Since the dollar volume of share buybacks has increased significantly in recent years, the motivation behind this paper is to investigate whether stock buyback announcements have an impact on stock prices and CDS of each firm making such a declaration. The study is conducted as follows: first, stock price, stock buyback announcement dates, and CDS data were collected for a group of publicly traded S&P 100 firms. For each entity, the event study methodology is employed, using the market model, to determine if there are significant reactions (abnormal returns) in the stock price (equity) and (abnormal changes) in the CDS market (debt derivatives)

on and around the stock buyback announcement date. Based on the weak form of the efficient market hypothesis, it is expected that market should "price in" the expected impact of the total stock buyback announcement on the declaration date. Thus, examining abnormal return (AR) should serve as a proxy for market responses in the wake of the news. Results, in the aggregate, will be tested for statistical significance. Second, AR and cumulative AR, for each event, will be tested in univariate and multivariate regression models and will utilize various control variables. Finally, robustness tests will be utilized, as well.

This paper differs from others found in the literature in a few ways. First, to the author's knowledge, no other study assesses the abnormal market reactions and cumulative abnormal changes in *both* stock price and credit default swaps for mega capitalization firms exclusively listed in the S&P100 index over a twenty-two day event period [Day -1 to Day +20]. Second, an array of control variables are included in multivariate regression models. While some of the control variables were adopted from a prior study by different researchers, other unique firm-level specific variables were also included.

This paper shows new facts, as the findings imply that stock buyback announcements for mega cap S&P100 firms are positively correlated with ARs, average ARs, cumulative ARs, and cumulative average ARs on the event date and in the days following a buyback announcement. These discoveries also illustrate that AC in CDS is positively correlated with stock buyback announcements on the event date, implying that the CDS market is "pricing-in" a heightened risk of default. Furthermore, the results from the multivariate regression models, using a unique set of control variables, further confirmed the above findings for equity. With regard to CDS, an initial analysis showed that stock buyback announcements are positively correlated with abnormal changes in spreads, with some statistical significance. Yet, a deeper investigation did not offer

additional confirmation of those results. Nonetheless, since the preliminary discoveries were statistically significant for CDS, the results are presented and discussed in the paper.

The remainder of the paper will be organized as follows: Section 2 will discuss the background of a credit default swap, its history, and its uses in the marketplace. Section 3 will present the null hypotheses tested for purposes of this study, while Section 4 will contain the review of the literature, which will include a summary of other author's research and findings on the topic of stock buybacks, bonds, and CDS event studies. Section 5 will present the motivation and methodology for the paper, and Section 6 will display the comprehensive data analysis and research findings. Finally, Section 7 will offer suggestions for future research, and conclusions will be discussed in Section 8.

2.0 BACKGROUND OF CREDIT DEFAULT SWAPS (CDS)

What is a CDS? Effectively, it is a form of a "credit-derivative" that will result in a payoff, to the holder, if an entity defaults on its debt.[15] Dr. John Hull, in the textbook, "Options & Derivatives," specifies that a CDS "is a contract that provides insurance against the risk of a default by a particular company."[16] A CDS can be viewed as an option on an issuer's debt. When purchasing and owning CDS, the buyer agrees to make periodic payments (typically quarterly) to the seller of the instrument. If the underlying entity remains solvent, the seller of the CDS will profit from the quarterly payments. Additionally, assuming the buyer also owns the underlying bond, this will reduce the buyer's effective return. Yet, if the bonds default, the buyer of the CDS

[15] Hull, J. (2015). p. 571.
[16] Ibid, p. 572.

will then collect a substantial payment from the CDS seller.[17] Hence, a CDS can be viewed as both a hedge on an entity's debt[18], as well as an indirect barometer of a firm's credit worthiness.

The security class is fairly young, as it has only been in existence for about a quarter-century. Its invention can be traced back to 1994 and Chase Manhattan bank[19] (preceding the merger with Chase Manhattan Bank in 2000). JPMorgan developed the instrument with the intent to "transfer credit risk exposure from its balance sheet to protection sellers,"[20] thus, giving birth to what is known today as CDS. However, the real beginnings of major trading activity in this marketplace began in 1999, when the International Swaps and Derivatives Association (ISDA) presented definitions for a standardized CDS contract.[21]

The value of a CDS is known as the "spread." If there is a deterioration in credit worthiness, the spread will increase, indicating that the price of hedging against possible default has risen. Alternatively, if the spread declines, this suggests that credit worthiness has improved, thus, decreasing risk.[22]

In a hypothetical example, assume that on January 1, 2018, ABC Corporation issued 10,000, 5-year 4.50% coupon bonds trading at par (usually $1000 per bond). Further, suppose that ABC Corporation has an assigned credit rating of BBB+ by Standard & Poor's, which is considered "middle-level" investment grade debt. If the marketplace valued the 5-year CDS at a spread of 120 (1.20%), the buyer of the CDS would make quarterly payments of 0.30% of the total principal to the seller of the instrument as protection against a default. This amounts to $3.00 per bond or $30,000, in total, each quarter, until the CDS reaches its maturity date. Thus, if

[17] Ibid, p. 572.
[18] Ibid, p. 574.
[19] Augustin, P., Subrahmanyam, M, Tang, D., and Wang, S. (30 Aug. 2016). p. 10.2.
[20] *Ibid.*
[21] Kyle, G. and Russell, A. (November 2012). p. 3.
[22] Hull, J. (2015). p. 573.

the individual owned the CDS and the underlying bonds, net earnings of 3.30% per year would result (4.50% gross yield to maturity less the 1.20% paid to the seller of the CDS). According to Hull, this 1.20% CDS spread can be viewed as the fee to convert a corporate bond into a "risk free bond."[23]

In most cases, a CDS contract would require that the buyer have physical possession of the underlying bond and relinquish ownership to the seller upon default (called physical settlement). For instance, if the firm approached default and the value of the underlying bond declined in value to $200, the owner of the CDS would be paid the full par value of $1000 and ownership of the bond would transfer to the CDS seller.[24] Conversely, a contract could, instead, only require a cash settlement. In that case, the difference between the par value and the market value of the bond is paid at time of default.[25] Based on the above example, if only cash settlement is required, the seller of the CDS would be required to pay the difference between par and the market value, which is $800. Thus, physical possession of the bond and transfer is not required.[26] Overall, in either scenario, a CDS can be regarded as a strong hedge against the probability of default.

PIMCO, a major investment firm, further presents various attributes of a CDS, which are displayed as follows: single-credit, multi-credit, and index. A single-credit instrument represents "one tradable CDS security that is for a single corporation or governmental entity,"[27] while a

[23] Ibid, pgs. 573 & 575.
[24] Ibid, p. 575.
[25] Kyle, G. and Russell, A. (November 2012). p. 2.
[26] *Ibid*, p. 2.
[27] PIMCO. Credit Default Swaps. *Understanding Investing*. Retrieved on June 10, 2018 from https://global.pimco.com/en-gbl/resources/education/understanding-credit-default-swaps

multi-credit contract can be comprised of a portfolio of multiple corporations or governmental entities." Alternatively, a CDS index is a composite of multiple organizations.[28]

Furthermore, CDS can offer many benefits to holder which includes: minimal capital outlays for ownership (compared to direct bond ownership), the ability to invest indirectly in the debt of foreign entities without being exposed to currency fluctuations, and the potential for better liquidity versus the corporate bond market.[29] Amato and Gyntelberg reinforce that a CDS is typically more liquid than a corporate bond, since the contracts are standardized and the holder has ability to effectively "go-long" or "go-short" credit risk at very little cost.[30] Thus, this should foster conditions for a market with enhanced liquidity.

While bankruptcy is the most common type of event, other situations can trigger a payment from the CDS seller to the CDS buyer. According to PIMCO, these "other events" include: a corporation failing to making interest and/or principal payments, restructuring debt (which could violate current debt covenants established by the bondholders), earlier-than-expected maturity of the underlying bond, and/or rejection of the debt by the issuing corporation.[31]

Although there had been explosive growth in the CDS marketplace from its inception in 1994 through the financial crisis of near 1000%, the market has been shrinking somewhat during the past decade. For instance, in late-2007, at the dawn of the financial crisis, there was $61.2 trillion in notional value of CDS contracts outstanding worldwide. That total amount was approximately 106% of 2007 global GDP of $57.8 trillion.[32] According to the Bank for

[28] *Ibid*.
[29] *Ibid.*
[30] Amato, J. and Gyntelberg, J. (March 2005). p. 74.
[31] *Ibid*.
[32] Federal Reserve Bank of St. Louis. Gross Domestic Product for the World. Retrieved on June 10, 2018 from https://fred.stlouisfed.org/series/MKTGDP1WA646NWDB

International Settlements, "notional amounts reflect the maximum potential exposure of the protection seller to the protection buyer."[33] The ability of the notional amount to exceed global GDP, at the birth of the financial crisis, was attributable to the fact that actual ownership of the bonds is not required. Thus, a copious amount of CDS existed and have been blamed for, at least in part, amplifying the severity of the financial crisis.[34] This argument can be connected with the "unwinding" effect of CDS, especially for contracts that did not require physical possession of the debt security by the buyer.

Yet, by late-2017, the amount of CDS outstanding has declined by over 84% to $9.4 trillion of notional value.[35] This decrease has been due to many factors, such as, "greater standardization of the marketplace, market concentration on CDS securities maturing in five-years[36] (rendered the most liquid area of the market), and improved credit conditions throughout the global economy." Nonetheless, the CDS market has become a very important barometer for credit worthiness and will continue to be a major instrument in the coming years.

3.0 NULL HYPOTHESES

Equity:

H0 (#1): There is no significant average abnormal return, in stock price, for the sample of S&P 100 firms, following an announcement of a stock buyback.

H0 (#2): There is no significant cumulative average abnormal return, in stock price, for the sample of S&P 100 firms, following an announcement of a stock buyback.

[33] Bank for International Settlements. (June 2018). International Banking & Financial Market Developments. *BIS Quarterly Review.* p. 3.
[34] *Ibid*, p. 1.
[35] *Ibid,* p. 3.
[36] *Ibid,* p. 4.

H0 (#3): There is no significant abnormal return, in stock price, for the sample of S&P 100 firms, following an announcement of a stock buyback, with regard to the percentage of shares repurchased.

H0 (#4): There is no significant abnormal return, in stock price, for the sample of S&P 100 firms, following an announcement of a stock buyback, with regard to the percentage of shares repurchased, earnings per share growth rate, percentage of retained earnings in the capital structure, debt-asset ratio, market capitalization, revenue growth rate, cash-to-sales ratio, Tobin's Q, and free cash flow growth.

H0 (#5): There is no significant cumulative abnormal return following an announcement, for the sample of S&P 100 firms, following an announcement of a stock buyback, with regard to the percentage of shares repurchased, earnings per share growth rate, percentage of retained earnings in the capital structure, debt-asset ratio, market capitalization, revenue growth rate, cash-to-sales ratio, Tobin's Q, and free cash flow growth.

Credit Default Swaps:

H0 (#6): There is no significant average abnormal change, in credit default swap spreads, for the sample of S&P100 firms, following an announcement of a stock buyback.

H0 (#7): There is no significant cumulative average abnormal change, in credit default swap spreads, for the sample of S&P100 firms, following an announcement of a stock buyback.

H0 (#8): There is no significant abnormal change, in credit default swap spreads, for the sample of S&P 100 firms, following an announcement of a stock buyback, with regard to the percentage of shares repurchased.

H0 (#9): There is no significant abnormal change, in the credit default swap spreads of S&P 100 firms, following an announcement of a stock buyback, with regard to control variables, such as, the percentage of shares repurchased, earnings per share growth rate, percentage of retained earnings in the capital structure, debt-asset ratio, market capitalization, revenue growth rate, cash-to-sales ratio, Tobin's Q, and free cash flow growth.

4.0 REVIEW OF THE LITERATURE

4.1 Event Studies- Equity Markets

In the literature, there is a plethora of research focusing on stock buyback activity and the corresponding effect on stock price. Many of these studies are quantitative in nature and focus on different variations of stock buybacks, such as open market purchases and accelerated buybacks. Alternatively, other researchers have conducted their research qualitatively. Each of the academic papers presented in the review of the literature have a slightly different focus, but all examined the potential impact of a stock buyback announcement, offering mixed results.

First, Michel, Oded, and Shaked (2010) focused on assessing the impact of both "short-run and long-run" stock performance following a corporation's pledge to repurchase shares under an accelerated program.[37] These researchers conducted their analysis via examining all announcements of accelerated share repurchase agreements occurring between 2004 and the end

[37] Michel, A., Oded, J., Shaked, I. (2010). p. 55.

of 2007. The authors asserted that accelerated repurchase plans did not exist prior to 2004, and therefore, their research offered insight into a relatively new phenomenon.[38]

Their analysis was conducted by investigating the cumulative response of a stock prior to the buyback declaration date and measured market performance in an event window from Days [-15, +15] [39] for 127 data points. The authors found evidence that there was a "negative cumulative average AR of 0.8% occurring from Days [-15, 0]." [40] However, after the event date, Michel, Oded, and Shaked determined that the stock typically rallies to a cumulative return of +0.4% by the third day after the announcement date. Nonetheless, by the end of the data series, the authors found that the average stock erodes to a mean cumulative return of -0.4%. [41]

To further assess robustness of the regression results, Michel, Oded, and Shaked prepared a multivariate regression analysis using cumulative AR for the 127 firms as the dependent variable and an array of independent variables. These variables included: the buyback amount as a percentage of market capitalization, market capitalization on the day prior to the stock buyback announcement, debt ratio, the cash to sales ratio, operating income to sales ratio, the book to market ratio, and two dummy variables which were unique to their data set. The researchers determined that the buyback percentage was statistically significant at the 1% level with a positive coefficient, the market capitalization and one dummy variable was statistically significant at the 5% level with a negative coefficient, and the debt ratio and the book to market ratio was statistically significant at the 10% level with a negative coefficient.[42] Nonetheless, although many of these independent variables showed statistically significant negative

[38] *Ibid*. p. 57.
[39] *Ibid*, p. 61.
[40] *Ibid, p.* 56.
[41] *Ibid.*
[42] *Ibid*. p. 64.

correlations with cumulative AR, the buyback percentage illustrated strong, positive statistical significance, strengthening the argument that stock buyback announcements are correlated with a positive AR.

In addition, the authors extended the study to the longer-term. They found that the cumulative average AR, on stocks of companies with accelerated buyback announcements, was -8.5% nine-months after the event date.[43] These results are rather startling, and imply that, on average, accelerated share buybacks do not have a positive impact on longer-run performance.

Conversely, Bradford (2008) specifically examined the influence of open market purchases on stock price. Bradford's research concentrated on a sample of 723 announcement dates by corporations and evaluated their respective "buy-and-hold abnormal returns and cumulative abnormal returns."[44] However, this study established additional conditions versus other research. In this analysis, only stock buybacks exceeding "1% of the total market value of the shares" were considered. [45] Their findings suggested that the market value of a stock is positively correlated with an open market share repurchase announcement. For example, Bradford discovered that the average "buy and hold abnormal return was 22.66% in the first year after the announcement, 13.98% in the second year, and near zero by the end of the third year."[46]

Additionally, Keasler and Byerly (2015), further considered the benefits of stock buybacks by assessing the impact on firm value. These authors proposed that there is a short-term impact on the market value of a firm's equity, but the results are inconclusive regarding the longer-term. Unlike other findings, these researchers suggested that stock repurchases could be a

[43] *Ibid.*
[44] Bradford, B. (2008). p. 45.
[45] *Ibid* p. 50.
[46] *Ibid* p. 55.

negative signal to the marketplace as buybacks could imply that a firm may have run out of ideas to invest funds in growth areas.[47] Their research proposed that long-term stock performance may benefit from a buyback only if the stock was initially undervalued and the share repurchase sought to remedy this problem. However, if the board of directors were motivated to conduct a share buyback for any other reason, the stock may not necessarily have a positive abnormal return.[48]

Similar to other event studies, Keasler and Byerly constructed an event window using the market model approach for ARs. The market model utilizes an ordinary least squares (OLS) regression and allows for an estimation of the expected return on a stock. The difference between the actual return and the expected return results in the computation of an abnormal return.[49] Keasler and Byerly's analysis included a sample of 91 firms which covered the event date, the day after the event, and ten days after the event. These researchers determined that the cumulative average AR, ten days after the announcement, was a positive 3.13%.[50]

Yet, their study took a further approach by assessing the market capitalization of businesses who conducted a stock buyback over the longer-run. Unlike most other event studies, these researchers assessed the changes in shares outstanding of a multitude of companies and the total market capitalization of those firms. Keasler and Byerly then grouped the population of firms into two categories, those who conducted a buyback and those who did not.[51] Overall, these researchers found that the market capitalization of firms who performed buybacks actually declined over the longer-term. Nonetheless, their evidence was inconclusive as to why this

[47] Keasler, T. and Byerly, R. (2015). p. 12.
[48] *Ibid* p. 13.
[49] MacKinlay, C. (1997). p. 20.
[50] Keasler, T. and Byerly, R. (2015) p. 21.
[51] *Ibid* p. 22.

phenomenon occurs. Rationally, if a stock buyback were to be effective, there should be a corresponding increase in the firm's value per share as the number of outstanding shares decline. They indicated that additional research should be conducted to examine the possible causes of market capitalization decay.[52]

Other the other hand, Ikenberry, Lakonishok, and Vermaelen (1995), focused principally on long-term performance following a stock buyback announcement. They also conducted an event study, focusing on "1,239 announced open market share repurchases between January 1980 and December 1990."[53] Throughout their research, they found that the average stock typically increased by 3.54% during the two day period after a share buyback announcement. However, they also indicated that over the ensuing days, the average stock price performance was "typically similar to that of the overall market."[54] Also, the authors determined that after an announcement, the stock prices of companies with "low market capitalization," or those that indicate the intention to engage in a large stock buyback, had the largest positive response. In addition, over the longer-run, which consisted of a post-event window of four years following the buyback announcement, they concluded that "undervalued firms" had the biggest cumulative gain of 45.3%.[55]

Ikenberry, Lakonishok, and Vermaelen also made a clear distinction between those firms who conducted a one-time announcement and those who had multiple buyback announcements. They indicated that approximately 25% of their sample consisted of repeat firms, and the stock prices of those companies experienced a cumulative AR of 15%, over the ensuing three year

[52] Keasler, T. and Byerly, R. (2015). p. 26.
[53] Ikenberry, D., Lakonishok, J., Vermaelen, T. (1995). p. 183.
[54] *Ibid* p. 190.
[55] *Ibid* p. 184.

period.[56] Based on their research, it appears that there is a positive short-term and long-term correlation between a stock buyback announcement and the firm's stock price. These findings demonstrate the strongest evidence, among all literature reviewed, of a positive long-term correlation between open market stock buybacks and the market value of the stock.

Finally, in connection to the above study, Peyer and Vermaelen (2009) reexamined the analysis conducted by Ikenberry, Lakonishok, and Vermalen (1995). Peyer and Vermaelen's goal was to update the prior research and assess whether the outcome changed in the modern era.[57] These authors hypothesized that that AR would continue to persist, both in the short-term and over the longer-run.[58] Using a similar methodology as Ikenberry, Lakonishok, and Vermalen, these researchers examined a sample of firms from 1991-2001, which included "5,348 open-market share repurchase announcements."[59] Their sample had nearly four times as many data points as Ikenberry, Lakonishok, and Vermalen. This illustrates the large increase in share repurchase activity occurring in the 1990s, as discussed by Bradford. Their findings were similar to the original study, as they determined that the average stock had an "AR of 2.39% in the three days following the announcement." [60] Yet, after expanding the sample to intervals of one year, two years, three years, and four years after the event date, these authors found statistically significant "cumulative average ARs, reaching 24.25% by the fourth year."[61]

In addition, these authors further examined the concept of "undervaluation" vs. "overvaluation." Their study categorized companies according to their "book-to-market" ratios. After separating firms into these two classes, the authors determined that entities with a high

[56] Ikenberry, D., Lakonishok, J., Vermaelen, T. (1995). p. 204.
[57] *Ibid.*
[58] Peyer, U. and Vermaelen, T. (2009) p. 1694.
[59] *Ibid,* p. 1697.
[60] *Ibid.*
[61] Peyer, U. and Vermaelen, T. (2009). p. 1701.

"book-to-market ratio" (implying undervaluation) had a "positive and significant AR of 28.89%, while firms with a relatively low ratio (implying overvaluation) had an AR of 14.87% over the four years following the event."[62]

Overall, the above studies have mostly indicated a positive, short-term response in stock price following a buyback announcement. However, the longer-term is more uncertain.

4.2 Event Studies- Debt

Besides equity, other researchers have attempted to examine the impact of stock buyback announcements on bondholders. For instance, Maxwell and Stephens (2003) collected bond data related to 945 stock buyback announcements.[63] Specifically, they sought to examine if there was any determinable "wealth transfer" between stockholders and bondholders at the time of a buyback declaration.[64] The researchers also conducted an event study and analyzed abnormal return on a bond by using the "mean-adjusted" return model, which accounts for changes in a bond's term structure. However, a large limitation to their analysis was that they only had access to monthly bond price data, which was noted to have a potentially diminishing effect on detecting statistically significant results.[65]

Furthermore, they indicated that a major complexity in bond analysis is that a firm may have numerous bond securities outstanding. Thus, Maxwell and Stephens used two approaches designated as the "all-bond" sample and the "weighted-average" sample. The "all-bond" approach treats each bond's abnormal return separately, while the "weighted-average" method averages the abnormal return for each bond that pertains to a single firm. The authors' note that

[62] *Ibid.*
[63] Maxwell, W. and Stephens, C. (April 2003). p. 900.
[64] *Ibid* p.902.
[65] *Ibid* p. 903.

cons exist with either method as the "all-bond" approach can cause a firm's bond data to appear multiple times due to the numerous bond issues, while the "weighted-average" method may cancel out the statistical significance of ARs for some securities due to the average effect.[66]

When computing AR, Maxwell and Stephens compared the difference between the actual return in bond price with the expected return in bond price for the announcement month only.[67] For the expected return, they chose to estimate the model coefficients using return data starting from three months prior to the announcement date. They suggested that using a longer estimation period could result in biased estimates due to the impact of confounding credit events.[68] Thus, they asserted that a shorter estimation window of expected return should result in unbiased coefficients.

Maxwell and Stephens found that stock buybacks do have a negative impact on bond price. They determined that, for the "weighted-average" sample, "the raw bond return was -0.110%, while the average excess bond return was -0.185%." Alternatively, in the "all-bond" sample, "the excess return was -0.127%." All of these returns were statistically significant at the 1% level.[69]

In addition, they, like other researchers, also assessed the impact of stock buyback announcements on stock price. Their research was two-fold as they examined the effect using daily data and monthly data. To compute expected return using the daily model, they regressed a stock's actual return against the CRSP equally weighted index from Days [-255, -30]. Conversely, for the monthly model, they regressed the stock's actual return against the CRSP equally weighted index from months [-60, -1]. For AR, they compared the stock's actual return

[66] *Ibid.*
[67] *Ibid, p.* 903.
[68] *Ibid*, p. 905.
[69] *Ibid* p. 908.

versus the expected return during Days [-1, +1].[70] Maxwell and Stephens found that there was a mean return of 1.50% and an excess return of 1.49% from Days [-1, +1], using daily data and a 1.27% excess return using monthly data. Those were, again, statistically significant at the 1% level. Overall, Maxwell and Stephens suggested that their findings were consistent with other studies in the literature that there is a wealth transfer from stockholders to bondholders upon the announcement of a stock buyback.[71]

Furthermore, Nishikawa, Prevost, and Rao (2011) also examined whether a wealth transfer exists from bondholders to stockholders from open market stock repurchases. They noted that there was conflicting evidence in the literature regarding the effect of stock repurchases on bond prices and sought to further investigate.[72] They conducted their study by gathering data for 364 open market repurchases from 1994 (the starting point for the Mergent Fixed Income Securities Database) through 2002, and collected daily bond price data.[73] Unlike the other studies, Nishikawa, Prevost, and Rao used the "yield spread" on a corporate bond, which is computed by taking the difference between the yield to maturity on a particular bond issue and the yield to maturity on a U.S. Treasury Yield with the same maturity date. However, since different bonds can have an array of maturity dates, interpolation was needed to estimate the yield to maturity on a U.S. Treasury security. Interpolation is a mathematical concept that involves estimating the "expected" value between two data points. The estimation period for the yield spread was from Days [-30, -1].[74] If the post-announcement yield changed on the bond security, that would indicate an adjustment in the implied credit risk due to a stock buyback announcement.

[70] *Ibid,* p. 905.
[71] *Ibid* p. 908.
[72] Nisikawa, T., Prevost, A., and Rao, R. (2011). p. 504.
[73] *Ibid*, p. 504.
[74] *Ibid*, p. 508.

Nishikawa, Prevost, and Rao determined that bondholders responded positively to an open market repurchase announcement, with an average decline in yield spread of 0.03% across the sample around the declaration date. This finding was statistically significant at the 5% confidence level.[75] However, when the sample was bifurcated into investment grade and speculative bonds, they determined that the buyback announcement caused an average 0.04% decline in investment grade yield spreads while an average 0.01% increase in speculative yield spreads resulted. Yet, the effect on speculative yield spreads was not considered to be statistically significant.[76] Accordingly, as investment grade bond yields declined around the announcement date, these researchers asserted that their findings contradict other literature that found that there is, in fact, a wealth transfer from bondholders to stockholders.

Furthermore, they found that bond ratings had a high probability of being upgraded in the months following a stock buyback announcement, especially for investment grade securities.[77] Thus, while a small, statistically significant impact on yield spread was observed for high-quality bonds, the findings suggest that credit quality is improved following these types of announcements.[78]

4.3 CDS Event Studies

Although stock buyback announcements were not the focus, other researchers have conducted event studies for different situations for the CDS marketplace. For instance, Okolo-Isiekwe (2011) conducted an event study investigating the impact of market and regulatory announcements on CDS during the pre-financial crisis period and during the economic malaise.

[75] *Ibid*, p. 510.
[76] *Ibid, p. 511.*
[77] *Ibid*. p. 521.
[78] *Ibid*, p. 521.

The author used the market model to conduct the study[79] and aimed to examine AC in a CDS in a "two-day event window"[80] in and around the event to eliminate any overlapping events. The author determined that CDS spreads for members of the Dow Jones Credit Default Swap Index declined an average of approximately .0088% on the date of the announcement in the pre-financial crisis period, .0103% during the financial crisis period, and .00097% after the economy and the markets stopped declining. Overall, the author suggested that the decline in CDS, during those periods, can be viewed favorably by the credit markets. Yet, Okolo-Isiekew found that the average CDS actually increased by .0025%, in response to a regulatory announcement, during the peak of the financial crisis.[81] Effectively, as the author asserted, these results were in contrast to other findings in the literature. Overall, Okolo-Isiekew detected that the CDS market reacts to a news announcement.

On the other hand, Greatrex (2008) examined a CDS's response to earnings announcements through conducting another event study. The author made the connection between earnings releases, cash flows, debt paying ability, and CDS. For instance, Greatex asserted that an earnings surprise will contain new market information related to an entity's future cash flows, and, thus, can have an impact on an entity's debt paying ability. Correspondingly, the market value of bonds can be affected and can cause the value of a CDS to change.[82] Greatex analyzed a total of "4,220 earnings announcements from January 1, 2001, through April 4, 2006, for 476 firms,"[83] which was based on the data available by MARKIT (a major supplier of CDS data), at that time.

[79] Okolo-Isiekwe, I. (2011) p. 68.
[80] *Ibid* p. 75.
[81] *Ibid p*. 76.
[82] Greatrex, C. (2009). p. 194.
[83] *Ibid*, p. 195.

Utilizing the event study methodology, the author computed expected return by regressing the change on a CDS against the "overall CDS market" from Days [-250, -21]. Similar to other studies, the estimation period was truncated at Day -21 to eliminate the possibility of the market "pricing in" information and skewing the model coefficients. For further model robustness, Greatex regressed the change in a CDS against credit ratings based on CDS indices, called the "index-adjustment procedure." This involved obtaining index data for bonds rates AAA/AA, A, BBB, and high yield. In both cases, the researcher placed the actual returns for the indices in the event window from Days [-20, +20]. [84]

Using the market model and analyzing AR on the earnings announcement date, Greatex determined that a "bad" earnings release caused a statistically significant positive change in an entity's CDS, while a "good" earnings release caused a negative change in a firm's CDS. If there was no deviation from earnings expectations, there wasn't a statistically significant change in CDS using the market model.[85] In conclusion, this event study determined that CDS spreads respond to new knowledge about cash flow prospects due to a surprising earnings release.

Throughout all the studies presented from the literature, most researchers have examined some correlation between a stock buyback announcement and AR in stock price and/or debt. A portion of the studies found more robust results versus others, and many focused on both the short-term and the long-term. In the foregoing section, a study will also be performed to assess if there is a near-term effect on stock price and perceived credit risk in the wake of a stock buyback announcement. However, the study will differ in a few capacities. First, to the author's knowledge, no other researcher has specifically examined the effect of stock buyback

[84] *Ibid*, p. 196.
[85] *Ibid*, p. 202.

announcements for specifically the "mega" cap S&P 100 companies. Second, this paper will use CDS to assess if there is an impact on the "price of credit" following a stock buyback declaration. Thirdly, to my knowledge, no other study examines AR, in both the stock price and CDS markets for S&P 100 firms, following a stock buyback announcement. Finally, a set of unique variables will be adopted and included in multiple regression models.

5.0 MOTIVATION & METHODOLOGY

As stock buybacks have become an ever-greater factor in the financial markets in recent years, it is essential to study the short-term implications that a share repurchase announcement may have on the market value of the underlying stock, as well as the credit default swap spread. While theory suggests that stock buybacks have a positive effect on shareholder wealth and a negative effect on CDS (widening spreads), this assertion must be tested by examining data.

For this study, stock buyback announcements pertaining to all the mega caps included in the S&P100 were examined. All the necessary firm-level data was collected via the Bloomberg, Mergent, CapitalIQ, and news-related databases. Although stock data for all 100 firms was gathered, several companies were removed from the study due to overlap with earnings releases. In that case, it is impossible to separate the two events, and accordingly, any share buyback announcement that coincided with an earnings release had to be eliminated. Additionally, each company's news release or publications, such as the Wall Street Journal, had to be referenced to determine if the announcement of a stock buyback occurred before, during, or after market hours. In the case that the announcement happened after the closing bell, the next trading day was then labeled as the event date.

Although the effect on stock price was a primary focus of this paper, all information had to be comparable with dates and availability of CDS data. Numerous firms did not have any CDS pricing data available, and some had very infrequent pricing with gaps of twenty trading days or more. Consequently, if CDS data was nonexistent or intermittent, the event date data was also removed from the equity portion of the study. In addition, only stock buyback announcements occurring on or after September 15, 2011, were examined. That date was chosen due to the availability of the MARKIT Investment Grade CDS Index via Bloomberg. Since that index was chosen as a proxy for market return for CDS, the data sample was limited to that starting date.

After eliminating businesses that did not have CDS and/or had stock buyback announcements overlapping with earnings releases, 53 firms were remaining to be included in the sample. However, many of these firms had repeat buyback announcements, and accordingly, the sample was expanded to 147 event dates. Yet, the sample was further minimized after considering the exclusion of firms that did not announce a share repurchase equaling a minimum of 2% of its market capitalization. In the literature, there were studies that chose either no minimum or at least 1% of the market capitalization. Alternatively, this study seeks to examine the impact of larger buybacks. Ultimately, 133 event dates were included.

For the study to be executed, first, a univariate regression model was prepared for each company surrounding the event date for both stock prices and CDS. For the equity portion of the analysis, an individual stock's return was regressed against the performance of the S&P 500 Index from Days [-60,-2] for each of the 133 events using Microsoft Excel. Under the market model methodology, the S&P500 was chosen as a proxy for market return. Sixty days prior to the event date was selected as the beginning of the estimation window as this is approximately *three* months before the release of the buyback news. Since there were some buyback

announcements that were within a half-year of each other, a three month estimation period eliminated the possibility of event periods overlapping and contaminating the model. Furthermore, Day -2 was designated as the end of the period to exclude the possibility of some market participants receiving the news early.

Subsequently, the coefficients from the regression output for each firm were individually used to establish if an AR exists following a stock buyback announcement. The data for all firms was grouped by each event date to determine the average AR per day from Days [0, +20]. Twenty days was designated as the end of the window as that is approximately one month after the news release. This approach was necessary to evaluate the cumulative AR among all companies in the data set. Next, a mean difference test, for both AR and cumulative AR for all firms, was used to test for statistical significance. The analysis allows for rejection or non-rejection of the null hypotheses.

Additionally, a similar methodology was applied for credit default swaps of the respective firms. To my knowledge, no other study has compared the effect of stock buyback announcements on both a firm's stock price and credit default swap spread for mega cap S&P 100 firms. To compute estimated return, another univariate regression model was used comparing the percentage change in a 5-Year Corporate CDS, as the dependent variable, against the change in the MARKIT Investment Grade Credit Default Swap Index. This follows a similar methodology to Fung, Sierra, Yau, and Zhang (2008), where they used the now defunct Dow Jones Investment Grade Credit Default Swap Index as market return.[86] However, the MARKIT Investment Grade Credit Default Index will now be used as a proxy for market return, similar to the S&P 500 for equity. The 5-year CDS was chosen as that is regarded to be the most liquid

[86] Fung, H., Sierra, G., Yau, J., Zhang, G. (2008). p. 45.

area of the CDS marketplace. Next, an alpha and a beta were computed using the regression of the percentage change in credit default swap spread against the percentage change in the Credit Default Swap Index for the period of Days [-60, -2]. The alpha and beta coefficients were used to find expected return in the period of Days [-1, +20]. Abnormal Change (AC) and cumulative AC were computed for each firm and are assessed through a mean difference test.

To further test results, AR and cumulative AR were regressed against the log of the percentage of stock buyback for equity, and the AC and cumulative AC were regressed against the same independent variable for CDS. However, a simple OLS model was not employed here; the Huber-White-Hinkley OLS regression model was utilized instead. The Huber-White-Hinkley Model was chosen to improve robustness of results, as it can reduce the risk of multicollinearity. This univariate regression was chosen for both stock price and CDS.

Finally, the study was extended to multivariate regressions. The independent variables included the log of buyback percentage, debt-to-total assets, year-over-year earnings per share growth, year-over-year revenue growth, percentage of retained earnings in the capital structure, the cash-to-sales ratio, market capitalization on the day preceding the buyback announcements, Tobin's Q, and free cash flow growth rate. These variables were regressed separately against AR and cumulative AR for equity and AC and cumulative AC for CDS.

6.0 DATA ANALYSIS

Throughout the analysis, an assessment of the impact on both stock price and the entity's CDS is conducted. The complete list of firms is included in Figure 1. Of the 53 firms analyzed, over 77% of them (41 firms) had more than one buyback announcement during the sample

period. However, for purposes of the study, a subsequent buyback announcement within six months of the prior announcement was not included. The composition of the buyback announcements is presented in Figure 2. Furthermore, statistics pertaining to the magnitude of the repurchase is illustrated in Figure 3.

In an effort to properly assess possible correlation between a stock buyback announcement and AR in a firm's stock price, a statistical analysis has been conducted. As discussed in the methodology section, data from 53 unique companies was selected, covering a 22-day event window from Days [-1, +20] for 133 firms. This relatively short event period examines the possible near-term impact of the event. The sample contained over six years of select data (September 2011-May 2018) and was comprised of a total of 2,926 "event window" days. However, the majority of the data was concentrated in the 2014-17 period, since most of the 5-Year Corporate CDS data and buyback dates were most abundant then. In the next section, average ARs for the sample will be assessed for overall trends and statistical significance.

Figure 1: **Corporate List**

3M	AT&T	CVS	IBM	Morgan Stanley	Union Pacific
Abbott Laboratories	Bank of America	Eli-Lilly	Johnson & Johnson	Nike	UnitedHealth
Allegran	Boeing	FedEx	JPMorgan Chase	Oracle	United Parcel Service
Allstate	Bristol Myers Squibb	Ford	Lockheed Martin	Pfizer	United Technologies
Alphabet	Capital One	General Dynamics	Lowe's	Phillip-Morris International	Verizon
Altria	Citigroup	General Electric	McDonald's	Raytheon	Wal-Mart
American Express	Coca Cola	General Motors	Medtronic	Target	Walt Disney Co.
AIG	Colgate-Palmolive	Home Depot	Merck	Texas Instruments	Wells Fargo
Amgen	Conoco Phillips	Honeywell	Microsoft	U.S. Bancorp	

Figure 2 **Industries & Composition of Buyback Announcements**	
Biotech	3.0%
Consumer Discretionary	2.3%
Transportation/Courier	4.5%
Defense	6.1%
Energy	0.8%
Entertainment	0.8%
Financial	25.0%
Food	0.8%
Insurance	6.1%
Manufacturing-General	4.5%
Manufacturing-Aerospace	6.8%
Manufacturing-Vehicles	3.0%
Pharmaceutical	7.6%
Rail/Transport	1.5%
Retail	10.6%
Tech/Hardware	8.3%
Tech/Software	2.3%
Telecom	5.3%
Tobacco	1.5%

Figure 3 **Buyback Size Statistics for Sample- Percentage of Market Capitalization**	
Minimum	2.0%
Maximum	16.7%
Average	6.9%
Median	6.0%

6.1a Equity

Utilizing the market model methodology, an OLS regression model was run in the pre-event period for Days [-60, -2] for the percentage change in share price of each company against the percentage change in the S&P500 Index (see Equation 1). After the regression parameters were computed, the expected change in stock price was computed for each day in the event and post event window for Days [-1, +20], by multiplying the actual percentage change in the S&P 500 by the beta coefficient and adding the alpha (intercept) term (see Equation 2). Finally, AR was calculated by taking the difference between actual return on a firm's stock and its expected

return on a trading day (see Equation 3). Thus, 133 OLS regression models were run and AR in stock price was computed for each of the aforementioned days for every firm in the sample. All results were then grouped by day, and a mean-difference test was conducted.

Equation 1: $Y(Stock\ j\ change) = a + B(X) + \mathcal{E}$

Equation 2: $[E]Rtj = aj + Bj(Xt) + \mathcal{E}$

Equation 3: $AR(i,t) = R(i,t) - (a + BX)$[87]

6.1b Mean-Difference Test & Results

Based on the results of a mean-difference test, a statistically significant average AR was not detected on Day -1 across all 133 events included in the study, which is in contrast to some other outcomes in the literature. Thus, it is interpreted that there is no statistically significant evidence that the market behaves abnormally on the day preceding a stock buyback announcement. In contrast, on Day 0, a stock buyback announcement is correlated with a very statistically significant average AR of +0.76%. The t-statistic is 5.633, and the p-value is near zero, indicating strong significance at the 1% level. Thus, null hypothesis #1 can be rejected.

Statistical significance is not again observed until Day 2, when the average AR is -0.14% with a t-statistic of 1.783 and a p-value of .0769. There is follow-through on Day 3, with a statistically significant average AR of -0.18%, with a t-statistic of 2.292 and a p-value of .0235.

Over the ensuing trading days, statistical significance is only detected on Days 8 and 19. Yet, there is a reversal of the abnormal gains, as there is an average AR of -0.14% and -0.20%, respectively. A t-statistic of 1.891 and a p-value of .0624 are found for Day 8 and a t-statistic of 1.943 and a p-value of .0542 are detected on Day 19, which are all significant at the 10% confidence level (see Table 1).

[87] MacKinlay, C. (1997). p. 15.

Table 1

Summary Statistics from Mean Difference Test for Abnormal Return (Equity)

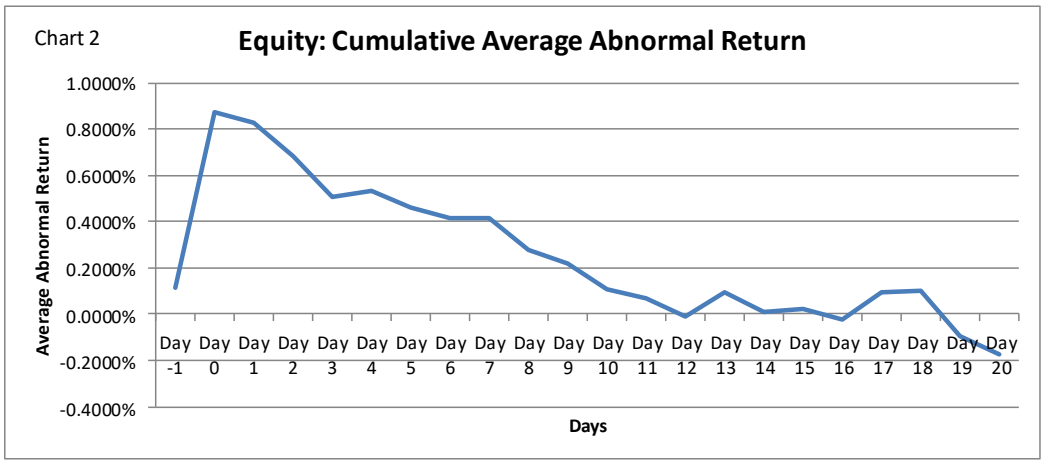
This table contains mean difference test results from 133 OLS regression models for 53 S&P 100 firms announcing stock buybacks between September 2011 and May 2018. The table presents statistics for the pre-event period (Day -1), the event date (Day 0), and the post-event period Day 1-20. Average Abnormal Return for Equity, Standard Deviation, t-statistics, p-values, and Kurtosis are presented for each day.

***Denotes statistical significance at the 1% confidence level
** Denotes statistical significance at the 5% confidence level
* Denotes statistical significance at the 10% confidence level

(1)	(2)	(3)	(4)	(5)	(6)
Event Period Day	Avg. Abnormal Return	Standard Deviation	T-Statistic	p-value	Kurtosis
Day -1	0.1156%	0.0008	1.5053	0.1346	3.1431
Day 0	**0.7602%**	**0.0013**	**5.6330*** **	**0.0000*** **	**1.0796**
Day 1	-0.0481%	0.0007	0.6569	0.5124	-0.0477
Day 2	**-0.1425%**	**0.0092**	**1.7826***	**0.0769***	**0.9413**
Day 3	**-0.1768%**	**0.0089**	**2.2917****	**0.0235****	**0.4398**
Day 4	0.0233%	0.0007	0.3214	0.7484	0.6045
Day 5	- 0.0718%	0.0076	1.0946	0.2757	1.6368
Day 6	-0.0452%	0.0078	0.6686	0.5049	3.5883
Day 7	0.0000%	0.0078	0.0006	0.9995	3.9378
Day 8	**-0.1392%**	**0.0084**	**1.9188***	**0.0572***	**1.6896**
Day 9	-0.0561%	0.0095	0.6824	0.4962	5.9959
Day 10	-0.1117%	0.0088	1.4560	0.1478	1.6181
Day 11	-0.0381%	0.0090	0.4864	0.6275	2.1019
Day 12	-0.0771%	0.0094	0.9482	0.3448	3.4908
Day 13	0.1049%	0.0085	1.4171	0.1588	-0.0646
Day 14	-0.0901%	0.0103	1.0110	0.3138	6.6837
Day 15	0.0148%	0.0123	0.1380	0.8904	19.6492
Day 16	-0.0418%	0.0113	0.4263	0.6706	5.8828
Day 17	0.1135%	0.0154	0.8504	0.3966	13.9805
Day 18	0.0090%	0.0107	0.0975	0.9225	2.7451
Day 19	**-0.1995%**	**0.0118**	**1.9426***	**0.0542***	**26.9245**
Day 20	-0.0776%	0.0092	0.9758	0.3309	1.0788

From the standpoint of the t-statistics computed from the mean difference test, it appears that there is a very significant AR on the announcement date, but the result, in the following days, does not show any further statistically significant gains over the event period. The only statistically meaningful findings occur on Days 2, 3, 8, and 19, with losses for average AR.

Furthermore, it is important to assess the cumulative average AR for all 133 events over the twenty-two-day event period. On a non-statistical level, the cumulative average AR reaches a peak on immediately on Day 0, reverses sharply by Day 3, and declines gradually to negative returns by Day 20 (see Chart 2).



Nonetheless, trends are relatively meaningless without statistical interpretation. Again, the mean-difference test was conducted for cumulative average AR for the mega caps for all event dates. With Day -1 designated as the beginning of the "cumulative" return period, the cumulative average AR jumps to 0.88% on Day 0, with a t-statistic of 5.612 and a p-value near zero, indicating high statistical significance at the 1% level. The cumulative average AR remains positive and statistically significant until Day 6, but the significance level gradually deteriorates to the 10% level. Although the cumulative average AR continues to be positive through Day 10, the results are inconclusive to indicate that the average AR is different from zero (see Table 2).

Based on the results, it is apparent that stock prices behave favorably in the wake of the buyback announcement as the market prices in this new information, but the impact wanes quickly in the trading sessions that follow. Thus, the argument exists that stock buyback announcements *do* have a positive impact on stock price, but the effect is only obvious in the short-run. Accordingly, null hypothesis #2 can be rejected.

6.1c Univariate OLS Regression Model: Abnormal Return on Day 0:

For additional examination, AR for each security, on Day 0, was regressed against the natural logarithm of the firm's announced buyback percentage. As discussed in the methodology

section, the buyback percentage was computed by dividing the dollar value of the announced share buyback program by the market capitalization of the security on the trading day prior to the buyback declaration. This was also one of the primary independent variables in the 2010 study by Michel, Oded, and Shaked and was cited by them to be a crucial variable listed in the literature.[88] Thus, buyback percentage is necessary as it is considered one of the primary factors driving AR on the announcement date. The model is presented in Equation 4.

Table 2

Summary Statistics from Mean Difference Test for Cumulative Abnormal Return (Equity)

This table contains mean difference test results from 133 OLS regression models for 53 S&P 100 firms announcing stock buybacks between September 2011 and May 2018. The table presents statistics for the pre-event period (Day -1), the event date (Day 0), and the post-event period Day 1-20. Cumulative Average Abnormal Return for Equity, Standard Deviation, t-statistics, p-values, and Kurtosis are presented for each day.

***Denotes statistical significance at the 1% confidence level
** Denotes statistical significance at the 5% confidence level
* Denotes statistical significance at the 10% confidence level

(1)	(2)	(3)	(4)	(5)	(6)
Event Period Day	Avg. Cumulative Abnormal Return	Standard Deviation	T-Statistic	p-value	Kurtosis
Day -1	0.1156%	0.0008	1.5053	0.1346	3.1431
Day 0	**0.8758%**	**0.0180**	**5.6121*** **	**0.0000*** **	**0.3984**
Day 1	**0.8277%**	**0.0208**	**4.5891*** **	**0.0000*** **	**0.3139**
Day 2	**0.6852%**	**0.0248**	**3.1888*** **	**0.0018*** **	**0.3922**
Day 3	**0.5084%**	**0.0268**	**2.19143** **	**0.0302*** **	**0.0291**
Day 4	**0.5317%**	**0.0281**	**2.1811** **	**0.0309** **	**-0.1643**
Day 5	**0.4599%**	**0.0284**	**1.8699***	**0.06369***	**-0.1713**
Day 6	**0.4146%**	**0.0288**	**1.6613***	**0.0990***	**-0.3015**
Day 7	0.4146%	0.0292	1.6364	0.1041	-0.3398
Day 8	0.2754%	0.0304	1.0438	0.2985	-0.0559
Day 9	0.2193%	0.0316	0.8000	0.4252	-0.3671
Day 10	0.1076%	0.0320	0.3880	0.6986	0.2308
Day 11	0.0695%	0.0338	0.2370	0.8130	0.2588
Day 12	-0.0077%	0.0353	0.0250	0.9801	-0.1349
Day 13	0.0972%	0.0377	0.2976	0.7665	0.2435
Day 14	0.0071%	0.0399	0.0206	0.9836	0.1428
Day 15	0.0219%	0.0411	0.0615	0.9511	0.0633
Day 16	-0.0199%	0.0440	0.0522	0.9584	0.0810
Day 17	0.0936%	0.0451	0.2394	0.8111	-0.1319
Day 18	0.1026%	0.0455	0.2603	0.7950	-0.0391
Day 19	-0.0969%	0.0482	0.2316	0.8172	-0.0308
Day 20	-0.1744%	0.0508	0.3962	0.6926	0.2195

Equation 4: $$ARj\ 0 = aj + Bj(\log(BB\%j)) + \mathcal{E}$$

[88] Michel, A., Oded, J., Shaked, I. (2010), p. 64.

The results of the univariate regression model show statistical significance at the 10% level for the log of the buyback percentage, with a t-statistic of 1.811 and a p-value of .0725. The Durbin-Watson statistic is 1.987, which indicates no autocorrelation, as well. In addition, the beta coefficient of the independent variable is positive, suggesting that there is a positive correlation between the magnitudes of the buyback percentage. These findings further demonstrate that stock buyback announcements are associated with positive stock returns on the announcement date. Based on these findings, null hypothesis #3 can be rejected.

Table 3

Summary Statistics from Univariate Regression Model for Abnormal Return on Event Date (Equity)

This table contains OLS regression output results from a univariate regression model where abnormal return results for each of the 133 observations of S&P 100 firms is regressed against the log of stock buyback percentage (Log (BB%)). The BB% was computed by dividing the dollar value of the announced stock buyback by the market capitalization of each firm on the day preceding the announcement. All data was collected between September 2011 and May 2018. The regression coefficients, t-statistics, p-values, R-square, F-statistic, and the Durbin-Watson Statistic are shown in this table. All OLS regression results were computed using the Huber-White-Hinkley model.

***Denotes statistical significance at the 1% confidence level
** Denotes statistical significance at the 5% confidence level
* Denotes statistical significance at the 10% confidence level

(1) Variable	(2) Coefficient	(3) T-Statistic	(4) p-value
α	0.0196	2.9039	0.0043
Log (BB%)	**0.0042**	**1.8109***	**0.0725***
R-Squared	0.0244		
F-Statistic	3.2792		
Durbin-Watson Statistic	1.9867		
Observations	133		

6.1d Multivariate Regression Analysis- Abnormal Return on Day 0:

To test for further confirmation of the above results, AR, on Day 0, was regressed against an array of independent variables. Using the 2010 study by Michel, Oded, and Shaked as a benchmark, other independent variables, such as market capitalization, cash to sales, and debt ratio were adopted. However, those variables that were deemed insignificant were excluded from the analysis, along with the dummy variables that were unique to that study. Furthermore, other

independent variables were included, such as earnings per share (EPS) growth year-over-year, revenue growth year-over-year, percentage of retained earnings in the capital structure, Tobin's Q, and free cash flow growth rate (see Equation 5). In the next paragraph, the rationale behind including these independent variables will be discussed.

Equation 5:
$$ARj\ 0 = aj + B1(\log(BB\%)) + B2(EPSG) + B3(\%RE) + B4(DR) + B5(MC) + B6(REVG) + B7(TQ) + B8(CSR) + B9(FCFG) + \varepsilon$$

First, the overall level of market capitalization is deemed important to assess whether AR is positively or negatively correlated with the size of the firm's market value. Being that the data collected for this paper consists of only S&P 100 firms, the behavior, in this marketplace, could differ from findings of other studies which use another data set. On the other hand, the cash to sales ratio represents how effectively sales are being converted into cash. Thus, a higher number is healthier and could be correlated with a positive AR. Finally, the debt ratio is paramount as it illustrates the degree of leverage a firm possesses. Higher leverage would suggest rising interest costs and reduced credit ratings. Since these control variables were significant in the Michel, Oded, and Shaked study, they are also incorporated into this paper.

In addition, the first new variable included is the year-over-year EPS growth rate. This variable was selected due to the assertion that higher earnings growth would signal improved ability of a firm to repurchase stock. The growth rate was collected from the end of quarter data preceding the buyback announcement. For instance, if a buyback announcement occurred on May 7 for Firm X, the year-over-year EPS growth rate was selected from the 1st quarter ended March 31st. Although, under GAAP, earnings are based on the accrual method, higher growth may serve as a proxy for the financial health of an entity. Thus, greater increases in earnings

could augment the ability of a firm to repurchase stock, resulting in an enhanced stock price following a buyback announcement.

Next, year-over-year revenue growth was included. This growth rate, similar to EPS, was taken from the quarter end prior to the buyback announcement. Although, conceptually, there may be some overlap between revenue growth and EPS growth, this is not necessarily the case. In many instances, revenues can be growing while EPS is shrinking if expense growth exceeds revenue increases. Conversely, EPS can rise in situations where revenue falls if there is cost cutting. Thus, it is also important to assess how AR is correlated with revenue growth activity.

Subsequently, the percentage of retained earnings in the capital structure was used in the model. Once again, the level of retained earned capital and assets on the balance sheet in the quarter prior to the buyback announcement was collected. Hypothetically, a balance sheet with more retained earnings would be healthier than a balance sheet with very little preserved capital. Moreover, if a firm has more cumulative earnings maintained in the business, they will have increased financial flexibility. Although a stock buyback program does not reduce retained earnings directly, treasury stock does have a negative effect on total shareholders' equity. Accordingly, higher retained earnings will also serve as an offset to increased contra equity.

The penultimate variable used was Tobin's Q, which was computed for all firms and event dates. Tobin's Q was calculated using the total stock market capitalization of a firm, as of the last day of the quarter preceding the stock buyback announcement, plus the book value of preferred stock and total liabilities divided by the book value of total assets.[89] For purposes of this study, it is assumed that the market value of preferred stock and debt is equal to the book

[89] Wharton School of Business. Tobin's Q, Altman Z-Score, & Company's Age. Retrieved on August 8, 2018 from https://wrds-www.wharton.upenn.edu/pages/support/applications/risk-and-valuation-measures/tobins-q-altman-z-score-and-companys-age/

value. It is expected that a higher Tobin's Q would suppress AR, while a lower Tobin's Q would result in a higher AR. Furthermore, it is anticipated that a high Tobin's Q would exist for an overvalued firm, while a lower Tobin's Q would be present for an undervalued entity. For all data included in this paper, the average Tobin's Q was 1.87, which implies that the mean "market price" of the average firm is 87% above the replacement cost of assets. In addition, 115 of 133 events (86.5%) contained firm-level data with a Tobin's Q exceeding 1.0, which, theoretically, suggests that vast majority of the sample is valued "above equilibrium" prior to the buyback announcement. Thus, it is paramount that Tobin's Q be included in this analysis.

Finally, the free cash flow growth rate is used as the last control variable. In the fields of finance and accounting, it is common knowledge that positive free cash flow should be a driver of certain activities by a corporation. If an entity has more free cash flow on hand, they have "extra" funds to make business acquisitions, reduce debt, issue larger dividends, and most importantly (for purposes of this study), repurchase more stock. Accordingly, it is critical to include the free cash flow growth rate to examine if that has any significant relationship with AR. This variable was also computed based on the quarterly results available prior to the stock buyback announcement.

6.1e Multivariate Regression Results- Abnormal Return on Day 0:

Using the Huber-White-Hinkley OLS regression analysis, it was determined that nearly all of the independent variables are statistically significant and correlated with AR on the event date. In this multivariate analysis, the log of buyback percentage is more statistically significant than in the univariate analysis with a positive regression coefficient of .0081, a t-statistic of

3.710, and a probability of 0.003, which indicates strong significance at the 1% confidence level. Hence, based on these observations, a larger buyback percentage corresponds with a greater AR.

Next, year-over-year EPS growth also has a positive regression coefficient of .0009, a t-statistic of 3.442, and a p-value of .0008, illustrating robust statistical significance at the 1% level. It is asserted that the market perceives higher earnings growth to be a positive indicator when a stock repurchase is announced. Thus, AR is positively correlated when EPS is growing.

The percentage of retained earnings in the capital structure was also favorably correlated with AR with a coefficient of .0161, a t-statistic of 4.263, and a p-value of .0000, indicating that more retained capital is correlated with a larger, positive AR. Again, this number is significant at the 1% confidence level. Accordingly, if the firm has a higher proportion of retained profit, they may be more apt to afford a stock repurchase program.

The next significant independent variable was market capitalization as of the trading day preceding the stock buyback announcement [Day -1]. This variable was statistically significant at the 1% level and had a positive regression coefficient of .000000024, a t-statistic of 5.687, and a p-value near zero. Due to the overall size of the market capitalization of firms, the coefficient is noticeably small, but, nonetheless, indicates a positive relationship with AR. Thus, the implication is that a larger market value is associated with a higher AR on the event date.

Furthermore, year-over-year revenue growth was positively correlated with AR with a beta coefficient of .0273, a t-statistic of 2.256, and a p-value of .0259. However, this was a bit weaker at the 5% confidence level. Nevertheless, the results illustrate that a positive relationship exists between the degree of revenue growth and the response of the market in the wake of a stock buyback declaration.

Also, Tobin's Q was statistically significant at the 1% level. However, this variable was the only one to have a *negative* beta coefficient of -.0070. The t-statistic was 4.337, and the p-value was near 0. As previously alluded, Tobin's Q can be used as a metric to assess over or undervaluation of a firm. Once again, it must be noted that the average Tobin's Q for all firms exceeded 1.0, which could imply an overvaluation at the time of a stock buyback declaration. Hence, the model results suggest that a higher Tobin's Q is correlated with a depressed AR. These findings are intuitive as it is expected that the market could perceive a stock buyback to *not* be the most appropriate method to spend resources if an entity is already overvalued.

In contrast to the findings in the Michel, Oded, and Shaked study, the debt ratio and the cash to revenue ratios were not statistically significant. The results for the debt ratio are especially surprising as leverage is regarded a significant factor in corporate performance. Finally, although the free cash flow growth rate approached statistical significance with a t-statistic of 1.487 and a p-value of .1396, it fails to reach the 10% confidence level. Thus, although it is assumed that higher free cash flow would be correlated with greater buyback volumes, the association with AR is not apparent in this data set.

Nevertheless, the majority of the control variables signify strong statistical significance with AR on the event date. In addition, the Durbin-Watson statistic remains close to 2.0, implying no autocorrelation among the variables. Moreover, the statistical significance of the buyback percentage improves with the inclusion of the various control variables, indicating that stock buyback announcements are positively correlated with AR on the event date (see Table 4). Therefore, based on these measurements, null hypothesis #4 is rejected.

Table 4

Summary Statistics from Multivariate Regression Model for Abnormal Return on Event Date (Equity)

This table contains OLS regression output results from a multivariate regression model where abnormal return results for each of the 133 observations of S&P 100 firms, on the event date (Day 0), is regressed against the following variables: log of stock buyback percentage (Log(BB%)), year-over-year earnings per share growth rate (YOYEPS), percentage of retained earnings in capital structure (PCTRE), debt-to-asset ratio (DA), market capitalization (MKTCAP), year-over-year revenue growth rate (YOYREV), Tobin's Q (TQ), cash-to-sales ratio (CTS), and free cash flow growth (FCFG). The BB% was computed by dividing the dollar value of the announced stock buyback by the market capitalization of each firm on the day preceding the announcement. YOYEPS, PCTRE, DA, YOYREV, TQ, and CTS were calculated from the quarterly report preceding the stock buyback announcement. MKTCAP was computed based on equity market results from the trading day preceding the stock buyback announcement. All data was collected between September 2011 and May 2018. The regression coefficients, t-statistics, p-values, R-square, F-statistic, and the Durbin-Watson Statistic are shown in this table. All OLS regression results were computed using the Huber-White-Hinkley model.

***Denotes statistical significance at the 1% confidence level
** Denotes statistical significance at the 5% confidence level
* Denotes statistical significance at the 10% confidence level

(1)	(2)	(3)	(4)
Variable	Coefficients	T-Statistic	p-value
α	0.0294	3.6686	0.0004
Log (BB%)	**0.0081**	**3.7102*** **	**0.0003*** **
YOYEPS	**0.0009**	**3.4420*** **	**0.0008*** **
PCTRE	**0.0161**	**4.2627*** **	**0.0000*** **
DA	0.0083	1.2860	0.2009
MKTCAP	**2.44E-08**	**5.6874*** **	**0.0000*** **
YOYREV	**0.0273**	**2.2556** **	**0.0259** **
TQ	**-0.0070**	**4.3367*** **	**0.0000*** **
CTS	-2.77E-05	0.0233	0.9815
FCFG	-0.0006	1.4868	0.1396
R-Squared	.2000		
Wald F-Statistic	7.7809		
Durbin-Watson Statistic	1.9596		
Observations	133		

6.1f VIF Test

In an effort to test for multicollinearity, a Variance Inflation Factor (VIF) test was conducted for all independent variables included in the multivariate regression analysis. Multicollinearity can cause major issues in OLS regression models as some, or all variables, can have a strong linear relationship. If variables have a solid linear pattern, they can destroy the integrity of the model, as it can result in an inflation of the coefficient results. As a general rule, if a variable has a centered VIF exceeding 10, the variable would possess the multicollinearltity problem. The VIF results are listed below in Table 5.

Table 5

Variance Inflation Factor (VIF) Test for Abnormal Return on Event Date (Equity)

This table contains Variance Inflation Factor (VIF) results for abnormal return for equity, for 133 observations on the event date (Day 0), following a stock buyback announcement to test for multicollinearity between variables. The independent variables include log of stock buyback percentage (Log (BB%)), year-over-year earnings per share growth rate (YOYEPS), percentage of retained earnings in capital structure (PCTRE), debt-to-asset ratio (DA), market capitalization (MKTCAP), year-over-year revenue growth rate (YOYREV), Tobin's Q (TQ), cash-to-sales ratio (CTS), and free cash flow growth rate (FCFG). The BB% was computed by dividing the dollar value of the announced stock buyback by the market capitalization of each firm on the day preceding the announcement. YOYEPS, PCTRE, DA, YOYREV, TQ, CTS, FCFG were calculated from the quarterly report preceding the stock buyback announcement. MKTCAP was computed based on equity market results from the trading day preceding the stock buyback announcement.

* Centered VIF <10
** Centered VIF < 5

(1) Variable	(2) Coefficient Variance	(4) Centered VIF
α	6.44E-05	NA
Log (BB%)	4.74E-06	1.7149**
YOYEPS	4.14E-05	1.1723**
PCTRE	0.000146	1.1292**
DA	6.32E-08	1.3524**
MKTCAP	2.60E-06	2.2169**
YOYREV	1.83E-17	1.3825**
TQ	1.43E-05	1.9438**
CTS	1.42E-06	1.2614**
FCFG	1.45E-07	1.5781**

Based on the VIF results, none of the independent variables included in the VIF analysis contained the multicollinarity problem, as all variables had a center VIF below 2.22. Thus, the robustness of this model is supported by these findings.

6.1g Correlation Matrix

Besides the VIF test, the correlation between all of the independent variables must be examined to assess whether any apparent linear relationship exists. Similar to VIF, assessing the correlation between variables is important in detecting whether multicollinearity exists. A correlation coefficient must range between -1.0 and + 1.0. However, any positive reading indicates an affirmative relationship between two variables, while an adverse reading implies an inverse relationship. The correlation coefficients, t-statistics, and p-values, between variables, are listed below in Table 6.

Table 6

Correlation Matrix: Independent Variables

This table contains correlation results for abnormal return for equity, for 133 observations on the event date (Day 0), following a stock buyback announcement. The variables include abnormal return (AR), log of stock buyback percentage (Log(BB%)), year-over-year earnings per share growth rate (YOYEPS), percentage of retained earnings in capital structure (PCTRE), debt-to-asset ratio (DA), market capitalization (MKTCAP), year-over-year revenue growth rate (YOYREV), Tobin's Q (TQ), cash-to-sales ratio (CTS), and free cash flow growth rate (FCFG). The BB% was computed by dividing the dollar value of the announced stock buyback by the market capitalization of each firm on the day preceding the announcement. YOYEPS, PCTRE, DA, YOYREV, TQ, CTS, FCFG were calculated from the quarterly report preceding the stock buyback announcement. MKTCAP was computed based on equity market results from the trading day preceding the stock buyback announcement.

***Denotes statistical significance at the 1% confidence level
** Denotes statistical significance at the 5% confidence level
* Denotes statistical significance at the 10% confidence level

Correlation Coefficients

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Variable	AR	Log (BB%)	YOYEPS	PCTRE	DA	MKTCAP	YOYREV	TQ	CTS	FCFG
Log (BB%)	**0.1563**									
YOYEPS	0.1018	**0.1806**								
PCTRE	0.0997	0.0930	0.0763							
DA	-0.0037	-0.0293	-0.0352	-0.1153						
MKTCAP	0.1310	**-0.2703**	-0.0829	-0.0764	0.0518					
YOYREV	**0.1445**	-0.0427	0.0233	-0.0787	-0.0198	0.00010				
TQ	-0.0646	**0.1983**	0.0769	**0.6535**	0.1187	0.0665	0.0309			
CTS	0.0095	**-0.1695**	-0.0041	**-0.3347**	**0.1665**	0.0253	0.0852	**-0.3434**		
FCFG	-0.0762	**0.1510**	0.0496	0.0719	0.0745	0.0670	0.0555	0.0842	-0.0720	

T-statistics

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Variable	AR	Log (BB%)	YOYEPS	PCTRE	DA	MKTCAP	YOYREV	TQ	CTS	FCFG
Log (BB%)	**1.8109***									
YOYEPS	1.1718	**2.1015****								
PCTRE	1.1463	1.0685	0.8753							
DA	0.0420	0.3361	0.4032	1.3282						
MKTCAP	1.5126	**3.2128*****	0.9519	0.8767	0.5938					
YOYREV	**1.6712***	0.4886	0.2673	0.9037	0.2262	0.0114				
TQ	0.7407	**2.3162****	0.8823	**9.8820*****	1.3677	0.7630	0.3536			
CTS	0.1084	**1.9682***	0.0474	**4.0646*****	**1.9331***	0.2902	0.9783	**4.1855*****		
FCFG	0.8743	**1.7484***	0.5678	0.8252	0.8549	0.7681	0.6364	0.9671	0.8257	-

Based on the correlation matrix, the vast majority of independent variables showed little correlation with each other. Furthermore, most of the correlation coefficients were not

statistically significant. The only correlation that displayed a moderate level of correlation, of +.6535, was between Tobin's Q and the percentage of retained earnings in the capital structure. The t-statistic of 9.8820 was statistically significant at the 1% level. Since balance sheet data is a significant factor in the computation of both of these independent variables, it is intuitive that an elevated correlation may be present. Yet, the positive correlation is still well below 1.0, which implies that the relationship has not reached extreme levels.

Overall, since the absolute values of most correlations were small and/or statistically insignificant, there is a substantially reduced risk of multicollinearity in the multivariate model. Hence, combined with the VIF results, robustness is reinforced.

6.1g Multivariate Regression Analysis- Cumulative Abnormal Return on Days 0 & 1

Based on the results of the mean difference test, the most statistically significant average AR was observed on the event date (see Table 1). As discussed in the previous section, the AR for all 133 events was analyzed in a univariate and a multivariate regression model. However, to further assess statistical significance, the cumulative AR for each firm, on the event date, will instead be used as the dependent variable. All of the aforementioned independent variables will again be utilized in the multivariate model. Although the average cumulative AR across firms begins on Day -1, that day was not statistically significant. Thus, the results from Day -1 are not considered here. However, Days 0 and 1 are chosen as dependent variables in slightly altered versions of the model, as the average cumulative AR was highly statistically significant on those dates. The results are presented in the following section.

6.1g (a) Multivariate Regression Analysis Results- Cumulative Abnormal Return on Day 0

Similar to the findings above where the AR on the event date is used, the cumulative AR on the event date produces nearly identical results. For instance, the buyback percentage, year-

over-year EPS growth rate, percentage of retained earnings in the capital structure, and Tobin's Q all remain statistically significant at the 1% level. Additionally, the year-over-year revenue growth rate remains statistically significant, but has weakened to the 10% confidence level. Finally, the control variables deemed insignificant remain this way in this model. Nonetheless, all of these variables support the assertion that stock buyback announcements do have a significant impact on stock price, validating the rejection of null hypothesis #5 (see Table 7).

Table 7

Summary Statistics from Multivariate Regression Model for Cumulative Abnormal Return on Event Date (Equity)

This table contains OLS regression output results from a multivariate regression model where cumulative abnormal return results for each of the 133 observations of S&P 100 firms, on the event date (Day 0), is regressed against the following variables: log of stock buyback percentage (Log(BB%)), year-over-year earnings per share growth rate (YOYEPS), percentage of retained earnings in capital structure (PCTRE), debt-to-asset ratio (DA), market capitalization (MKTCAP), year-over-year revenue growth rate (YOYREV), Tobin's Q (TQ), cash-to-sales ratio (CTS), and free cash flow growth rate (FCFG). The BB% was computed by dividing the dollar value of the announced stock buyback by the market capitalization of each firm on the day preceding the announcement. YOYEPS, PCTRE, DA, YOYREV, TQ, CTS, and FCFG were calculated from the quarterly report preceding the stock buyback announcement. MKTCAP was computed based on equity market results from the trading day preceding the stock buyback announcement. All data was collected between September 2011 and May 2018. The regression coefficients, t-statistics, p-values, R-square, F-statistic, and the Durbin-Watson Statistic are shown in this table. All OLS regression results were computed under the Huber-White-Hinkley model.

***Denotes statistical significance at the 1% confidence level
** Denotes statistical significance at the 5% confidence level
* Denotes statistical significance at the 10% confidence level

(1)	(2)	(3)	(4)
Variable	Coefficients	T-Statistic	p-value
α	0.0296	3.1644	0.0020
Log (BB%)	**0.0073**	**2.7800*** **	**0.0063*** **
YOYEPS	**0.0010**	**3.7827*** **	**0.0002*** **
PCTRE	**0.0174**	**3.5597*** **	**0.0005*** **
DA	0.0034	0.4335	0.6654
MKTCAP	**2.98E-08**	**6.1154*** **	**0.0000*** **
YOYREV	**0.0221**	**1.8305***	**0.0696***
TQ	**-0.0071**	**3.0034*** **	**0.0032*** **
CTS	0.0002	0.1121	0.9109
FCFG	-0.0003	0.8399	0.4026
R-Squared	0.1578		
Wald F-Statistic	7.8858		
Durbin-Watson Statistic	1.8404		
Observations	133		

6.1g (b) Multivariate Regression Analysis Results- Cumulative Abnormal Return on Day 1

As an additional assessment, cumulative AR on Day 1, for each of the 133 events, was regressed against the independent variables in another version of the model. Once again, buyback percentage is significantly correlated with cumulative AR on Day 1, with a positive beta coefficient of .0083, a t-statistic of 2.753, and a p-value of .0068, yielding significance at the 1% level. Moreover, percentage of retained earnings in the capital structure and market capitalization remain significant at the 1% level, with regression coefficients of .0169, and .00000003, respectively. Additionally, while Tobin's Q remains highly significant, it weakened to the 5% level with a coefficient of -.0062, a t-statistic of 2.330, and a p-value of .0214. Nonetheless, these findings are congruent with those above where cumulative AR, on Day 0, is used as the dependent variable.

However, the EPS growth rate and revenue growth rate join the debt ratio, cash-to-sales ratio, and free cash flow growth rate in being statistically insignificant. These new findings are two-fold. First, the majority of the control variables continue to be statistically significant, which supports the notion that stock buyback announcements are a contributing factor to abnormal performance of a stock following a repurchase announcement. Yet, these new findings suggest that the effect of EPS growth and revenue growth dissipates after the event date (see Table 8).

Overall, all of the above results indicate that stock buyback announcements do have a significant, beneficial effect on stock price on the event date and over the succeeding days. Based on the average cumulative AR, strong statistical significance remains through Day 2 at the 1% level. However, significance is still detected through Day 6. These findings are validated by multivariate regression models with the inclusion of an array of control variables against AR and cumulative AR on the event date and Day 1. Nonetheless, there is a significant, positive

correlation with the size of the buyback percentage and the abnormal performance of a stock price. Thus, these results reinforce the above conclusions that significant AR, average AR across all stocks, cumulative AR, and average cumulative AR across all stocks exist following a stock buyback, resulting in all null hypotheses, for equity, being rejected.

Table 8

Summary Statistics from Multivariate Regression Model for Cumulative Abnormal Return on Day 1 (Equity)

This table contains OLS regression output results from a multivariate regression model where cumulative abnormal return results for each of the 133 observations of S&P 100 firms, on the event date (Day 0), is regressed against the following variables: log of stock buyback percentage (Log(BB%)), year-over-year earnings per share growth rate (YOYEPS), percentage of retained earnings in capital structure (PCTRE), debt-to-asset ratio (DA), market capitalization (MKTCAP), year-over-year revenue growth rate (YOYREV), Tobin's Q (TQ), cash-to-sales ratio (CTS), and free cash flow growth rate (FCFG). The BB% was computed by dividing the dollar value of the announced stock buyback by the market capitalization of each firm on the day preceding the announcement. YOYEPS, PCTRE, DA, YOYREV, TQ, CTS, and FCFG were calculated from the quarterly report preceding the stock buyback announcement. MKTCAP was computed based on equity market results from the trading day preceding the stock buyback announcement. All data was collected between September 2011 and May 2018. The regression coefficients, t-statistics, p-values, R-square, F-statistic, and the Durbin-Watson Statistic are shown in this table. All OLS regression results were computed using the Huber-White-Hinkley model.

***Denotes statistical significance at the 1% confidence level
** Denotes statistical significance at the 5% confidence level
* Denotes statistical significance at the 10% confidence level

(1)	(2)	(3)	(4)
Variable	Coefficients	T-Statistic	p-value
α	0.0307	2.8382	0.0053
Log (BB%)	**0.0083**	**2.7529*** **	**0.0068*** **
YOYEPS	2.94E-05	0.0812	0.9354
PCTRE	**0.0169**	**2.8709*** **	**0.0048*** **
DA	0.0038	0.4462	0.6562
MKTCAP	**2.82E-08**	**5.5004*** **	**0.0000*** **
YOYREV	**0.0259**	**1.7786***	**0.0778***
TQ	**-0.0062**	**2.3299** **	**0.0214** **
CTS	-0.0002	0.1174	0.9068
FCFG	-0.0006	1.3357	0.1841
R-Squared	0.1187		
Wald F-Statistic	3.6950		
Durbin-Watson Statistic	2.0307		
Observations	133		

6.2a Credit Default Swaps

Next, the CDS market will be examined. The event study market model methodology was again utilized to assess if there is an abnormal "change" in a firm's 5-Year CDS following a stock buyback announcement. The estimation window, to compute the base regression

coefficients (the alpha and beta), was from Days [-60 to -2]. Although other studies have gone back as far as Day -180 to begin the estimation window, a shorter horizon was selected here, as some firms had more than one buyback announcement in the same calendar year. Thus, a longer estimation window would result in an overlap in the estimation period. Sixty days is approximately three months prior to the announcement date and was considered.

This aspect of the study utilizes an OLS regression analysis, with the percentage change in a firm's CDS as the dependent variable and the percentage change in the MARKIT Investment Grade Credit Default Index as the independent variable. This methodology is also congruent with the market model for event studies (see Equation 6). Thus, as was the case with the equity portion of the analysis, 133 individual regression models were generated. After the parameters for the intercept and the beta coefficients were determined for each CDS from the estimation regressions, expected percentage change in a firm's CDS during each of the trading days [-1, +20] were calculated (see Equation 7). Then, the abnormal percentage change in a CDS was computed by taking the actual percentage change on a CDS during each of the trading days between Days [-1, +20] and subtracting the expected percentage change in the CDS on each of those days (see Equation 8).

Equation 6: $$Y(CDS\ Change) = a + B(X) + \mathfrak{E}$$

Equation 7: $$[E]Rt = a + B(Xt) + \mathfrak{E}$$

Equation 8: $$AR(i,t) = R(i,t) - (a + BX)$$[90]

[90] MacKinlay, C. (1997). p. 15.

6.2b Mean Difference Test

Based on the results of a mean-difference test, a statistically significant average abnormal change (AC), at the 10% level, was detected on Day -1 across all 133 events, with a t-statistic of 1.815 and a p-value of .0718. However, the regression coefficient is negative, indicating a decline in perceived risk of default, among the firms, on the trading day prior to the stock buyback announcement. Conversely, on Day 0, a buyback announcement is correlated with a statistically significant average AC of +0.83%. The t-statistic is 2.206, and the p-value is .0291, demonstrating significance at the 5% confidence level. Based on these results, it appears that, on average, the CDS market reacts positively when a stock buyback is declared, which infers that the market perceives that there is an increase in the probability of default. Statistical significance is also observed on Day 1, with an average AC of -0.53%, a t-statistic of 1.992, and a p-value of .0485. Yet, the mean AR is negative, indicating a partial reversal of the gains on Day 0.

Throughout the subsequent trading days, statistical significance is only again detected on Days 6, 9, and 12. On Days 6 and 9, there is an average AC of +0.53% and +0.79%, respectively. A t-statistic of 2.661 and a p-value of .0087 are discovered for Day 6 and a t-statistic of 2.884 and a p-value of .0046 are detected on Day 12, which are all significant at the 1% confidence level. Yet, on Day 12, there is an average AC of -0.63%, a t-statistic of 2.035, and a p-value of .0439. This result is statistically significant at the 5% level (see Table 9). Due to these findings, null hypothesis #6 can be rejected.

When compared to the average AR for equity, there is far greater variability in CDS at the end of each trading day, based on the outcomes from the mean-difference test. Overall, while the market appears to price in heightened risk of default upon the announcement, the market is

volatile during the ensuing trading days, with both statistically positive average ACs and negative average ACs.

With regard to the statistically significant gyrations in cumulative average AC observed on Days -1, 0, and 1, it is theorized that this is due to market re-pricing impacts on and around the event date. However, it is speculated that the statistically significant cumulative average AC observed on Days 6, 9, and 12, are, instead, due to portfolio-rebalancing effects.

Table 9

Summary Statistics from Mean Difference Test for Average Abnormal Change (Credit Default Swaps)

This table contains mean difference test results from 133 OLS regression models for 53 S&P 100 firms announcing stock buybacks between September 2011 and May 2018. The table presents statistics for the pre-event period (Day -1), the event date (Day 0), and the post-event period Day 1-20. Average Abnormal Change in CDS, Standard Deviation, t-statistics, p-values, and Kurtosis are presented for each day.

***Denotes statistical significance at the 1% confidence level
** Denotes statistical significance at the 5% confidence level
* Denotes statistical significance at the 10% confidence level

(1)	(2)	(3)	(4)	(5)	(6)
Event Period Day	Avg. Abnormal Change	Standard Deviation	T-Statistic	p-value	Kurtosis
Day -1	**-0.5845%**	**0.0371**	**1.8150***	**0.0719***	**11.7048**
Day 0	**0.8279%**	**0.0433**	**2.2064****	**0.0291****	**23.2549**
Day 1	**-0.5314%**	**0.0354**	**1.9916****	**0.0485****	**9.1001**
Day 2	-0.1419%	0.0422	0.0715	0.9431	13.8761
Day 3	0.3327%	0.0251	1.5302	0.1284	3.9755
Day 4	0.2173%	0.0352	0.7113	0.4781	27.4870
Day 5	-0.4381%	0.0346	1.4594	0.1468	16.4399
Day 6	**0.5342%**	**0.0231**	**2.6614*****	**0.0087*****	**5.0166**
Day 7	-0.3649%	0.0321	1.3110	0.1921	9.9249
Day 8	-0.3366%	0.0274	1.4149	0.1595	1.6005
Day 9	**0.7932%**	**0.0317**	**2.8842*****	**0.0046*****	**7.8642**
Day 10	-0.2268%	0.0328	0.7966	0.4271	15.9451
Day 11	0.3391%	0.0341	1.1468	0.2535	8.1693
Day 12	**-0.6305%**	**0.0357**	**2.0345****	**0.0439****	**10.9636**
Day 13	0.2135%	0.0380	0.6480	0.5181	27.0165
Day 14	-0.1988%	0.0301	0.7607	0.4482	3.5204
Day 15	-0.3561%	0.0287	1.4284	0.1555	4.3594
Day 16	0.0658%	0.0305	0.2485	0.8041	2.8637
Day 17	-0.4685%	0.0437	1.2368	0.2184	28.4090
Day 18	0.1969%	0.0572	0.3973	0.6918	71.5931
Day 19	0.1272%	0.0343	0.4277	0.6696	9.3419
Day 20	0.1920%	0.0309	0.7167	0.4748	4.7906

Additionally, it is critical to analyze the cumulative average AC for all 133 events over the twenty-two-day event period. On a non-statistical level, the cumulative average AC jumps to

+0.24% on Day 0, and then reverses on Day 1. The cumulative average AC remains volatile in the coming days, and then peaks at +0.42% on Day 11 (see Table 10). From a statistical perspective, the only day that shows weak statistical significance at the 10% level is Day -1, with a t-statistic of 1.815 and a p-value .0718. Nonetheless, the trend for cumulative average AC is far less apparent than the trend for cumulative average AR for equity in the days following a stock buyback announcement. Thus, there isn't enough evidence to reject null hypothesis #7.

Table 10

Summary Statistics from Mean Difference Test for Cumulative Abnormal Change (CDS)

This table contains mean difference test results from 133 OLS regression models for 53 S&P 100 firms announcing stock buybacks between September 2011 and May 2018. The table presents statistics for the pre-event period (Day -1), the event date (Day 0), and the post-event period Day 1-20. Cumulative Average Abnormal Change for CDS, Standard Deviation, t-statistics, p-values, and Kurtosis are presented for each day.

***Denotes statistical significance at the 1% confidence level
** Denotes statistical significance at the 5% confidence level
* Denotes statistical significance at the 10% confidence level

(1)	(2)	(3)	(4)	(5)	(6)
Event Period Day	Cumulative Avg. Abnormal Change	Standard Deviation	T-Statistic	p-value	Kurtosis
Day -1	**-0.5845%**	**0.0371**	**1.8150***	**0.0719***	**11.7048**
Day 0	0.2434%	0.0406	0.6917	0.4903	2.1972
Day 1	-0.2881%	0.0498	0.6681	0.5052	4.0694
Day 2	-0.4300%	0.0577	0.8598	0.3915	4.8082
Day 3	-0.0973%	0.0641	0.1752	0.8612	4.5856
Day 4	0.1200%	0.0694	0.1994	0.8423	4.0088
Day 5	-0.3181%	0.0671	0.5469	0.5854	2.1460
Day 6	0.2161%	0.0714	0.3490	0.7277	1.9255
Day 7	-0.1488%	0.0806	0.2130	0.8317	0.9752
Day 8	-0.4854%	0.0863	0.6490	0.5175	1.4430
Day 9	0.3078%	0.0881	0.4030	0.6877	2.4031
Day 10	0.0810%	0.0882	0.1059	0.9158	0.8917
Day 11	0.4201%	0.1020	0.4750	0.6356	0.8883
Day 12	-0.2104%	0.1037	0.2341	0.8153	0.7300
Day 13	0.0031%	0.1077	0.0033	0.9974	0.6695
Day 14	-0.1957%	0.1072	0.2105	0.8336	1.0573
Day 15	-0.5518%	0.1158	0.5498	0.5834	0.7318
Day 16	-0.4860%	0.1130	0.4962	0.6206	0.1130
Day 17	-0.9545%	0.1234	0.8925	0.3738	0.4789
Day 18	-0.7576%	0.1297	0.6734	0.5019	1.2737
Day 19	-0.6304%	0.1309	0.5556	0.5795	0.9772
Day 20	-0.4384%	0.1330	0.3802	0.7044	0.7907

6.2c-Univariate Regression Model- CDS on Day 0

Similar to the equity analysis, AC for each event date was regressed against the natural logarithm of the firm's announced buyback percentage. As buyback percentage was highly correlated with AR for equity, it is also imperative to assess if a parallel effect is observed for AC in CDS. The model is presented below in Equation 9.

Equation 9: $$ACCDSj\ 0 = aj + Bj(\log(BB\%j)) + \varepsilon$$

Unlike the equity aspect of the analysis, the results of the univariate regression model did not display any significance for log of buyback percentage. Thus, even though the mean-difference test demonstrates that there is a highly significant AC in CDS on the event date, the findings cannot be further validated in the univariate model (see Table 11). Consequently, null hypothesis #8 cannot be rejected.

Table 11

Summary Statistics from Univariate Regression Model for Abnormal Return on Event Date (Credit Default Swaps)

This table contains OLS regression output results from a univariate regression model where abnormal change results for CDS for each of the 133 observations of S&P 100 firms, on the event date (Day 0), is regressed against the log of stock buyback percentage (Log(BB%)). The BB% was computed by dividing the dollar value of the announced stock buyback by the market capitalization of each firm on the day preceding the announcement. All data was collected between September 2011 and May 2018. The regression coefficients, t-statistics, p-values, R-square, F-statistic, and the Durbin-Watson Statistic are shown in this table. All OLS regression results were computed using the Huber-White-Hinkley model.

***Denotes statistical significance at the 1% confidence level
** Denotes statistical significance at the 5% confidence level
* Denotes statistical significance at the 10% confidence level

(1) Variable	(2) Coefficient	(3) T-Statistic	(4) p-value
α	0.0156	1.2863	0.2006
Log (BB %)	0.0026	0.6454	0.5198
R-Squared	0.0012		
Wald F-Statistic	0.4166		
Durbin-Watson Statistic	1.9603		
Observations	133		

6.2d- CDS Multivariate Regression Analysis- Abnormal Change on Day 0

As a further test, AC, on Day 0, was regressed against all of the same independent variables that were used for the equity analysis. Although these variables were initially chosen for equity, they still contain pertinent information regarding unique firm-level characteristics (see Equation 10).

Equation 10:

$$ACCDSj\ 0 = aj + B1(\log(BB\%)) + B2(EPSG) + B3(\%RE) + B4(DR) + B5(MC) + B6(REVG) + B7(TQ) + B8(CSR) + \varepsilon$$

Dissimilar to the findings for share price, the results are not very apparent for CDS. With the exception of Tobin's Q, all other control variables are insignificant on the event date. Tobin's Q has a positive beta coefficient of .0084, a t-statistic of 1.906, and a p-value of .0590, indicating significance at the 10% confidence level. It is hypothesized that a higher Tobin's Q, as of the quarter-end preceding the buyback announcement, is positively correlated with CDS on the day a stock buyback is declared. An assumption is made that there should be a greater increase in credit risk if Tobin's Q is already elevated. Nonetheless, since buyback percentage is not significant, it is difficult to draw any clear conclusions in this instance (see Table 12). Moreover, being that cumulative average AC is insignificant on Days -1, 0, and 1 based on the results of the mean difference test, a multivariate analysis, using cumulative average AC for CDS, was not considered here.

While the findings of the mean difference test illustrate that there is a significant, abnormal jump in CDS on the date a stock buyback is announced, it cannot be further verified through the univariate or multivariate regression models in the expanded analysis. Nevertheless,

since a statistically significant trend was observed initially, deeper investigations are necessary to consider in future research.

Table 12

Summary Statistics from Multivariate Regression Model for Abnormal Change on Event Date (Credit Default Swaps)

This table contains OLS regression output results from a multivariate regression model where abnormal change results for CDS for each of the 133 observations of S&P 100 firms, on the event date (Day 0), is regressed against the following variables: log of stock buyback percentage (Log(BB%)), year-over-year earnings per share growth rate (YOYEPS), percentage of retained earnings in capital structure (PCTRE), debt-to-asset ratio (DA), market capitalization (MKTCAP), year-over-year revenue growth rate (YOYREV), Tobin's Q (TQ), cash-to-sales ratio (CTS), and free cash flow growth rate (FCFG). The BB% was computed by dividing the dollar value of the announced stock buyback by the market capitalization of each firm on the day preceding the announcement. YOYEPS, PCTRE, DA, YOYREV, TQ, CTS, and FCFG were calculated from the quarterly report preceding the stock buyback announcement. MKTCAP was computed based on equity market results from the trading day preceding the stock buyback announcement. All data was collected between September 2011 and May 2018. The regression coefficients, t-statistics, p-values, R-square, F-statistic, and the Durbin-Watson Statistic are shown in this table. All OLS regression results were computed using the Huber-White-Hinkley model.

***Denotes statistical significance at the 1% confidence level
** Denotes statistical significance at the 5% confidence level
* Denotes statistical significance at the 10% confidence level

(1)	(2)	(3)	(4)
Variable	Coefficients	T-Statistic	p-value
α	0.005971	0.367771	0.7137
Log (BB %)	-0.000349	0.071946	0.9428
YOYEPS	-0.001328	1.344174	0.1814
PCTRE	-0.006654	0.639643	0.5236
DA	-0.023561	1.323486	0.1881
MKTCAP	-1.34E-08	1.283557	0.2017
YOYREV	-0.014764	0.588229	0.5575
TQ	0.008427	1.905974*	0.0590*
CTS	0.001172	0.825501	0.4107
FCFG	0.000286	0.369118	0.7127
R-Squared	0.0267		
Wald F-Statistic	1.0041		
Durbin-Watson Statistic	1.9612		
Observations	133		

7.0- FUTURE RESEARCH

With the recent changes to the U.S. tax code, a boon has been created for U.S. companies, especially those that have cash reserves overseas and are considering repatriation. Thus, there are a number of companies who have announced new stock buyback programs or an expansion of an existing one. If these buybacks are of a significant magnitude, the potential exists for share counts to decrease dramatically. Therefore, it would be useful to repeat this study again in the next few years in order to assess whether the observed patterns are sustained. In

addition, if a portion of these buybacks are financed by debt, a different reaction in stock price and CDS may result compared to the findings in this paper.

For instance, according to the credit ratings agency Moody's, "debt for U.S. companies has surged 49% since the [financial] crisis," largely due to financing large stock buyback plans and dividend hikes.[91] It is indicated that many of these entities, even the previously regarded prime credit companies, have faced credit ratings downgrades as a result of elevated leverage. Thus, credit ratings have declined from prime to lower investment grade. As of May 2018, only 14% of U.S. firms have top credit, which is down from 21% prior to before the financial crisis.[92] Hence, the potential exists for the CDS market to react more harshly in years to come if businesses continue to pass the optimal point of debt, in the capital structure, and the risk of bankruptcy increases. Accordingly, stock prices could also begin to react negatively if a buyback is announced under those conditions.

In addition, as a deeper component of analysis, it is important to assess the true cause of AC in the credit default swaps on the date of a buyback announcement. Since the mean difference test presented a statistically significant AC on the event date, there are enough research findings to support further investigation. It is possible that an expansion of the study and/or the inclusion of other independent variables may produce different results. For example, since this paper concentrated on the mega cap, blue-chip, S&P100 firms, the reaction of the CDS market might be more subdued in the wake of a buyback announcement, as they were all assigned an investment grade credit rating. However, if a future study were to analyze high-yield entities or both high-yield and investment grade, the outcomes could potentially differ.

[91] Cox, J. (2018, May 25). Moody's Warns of 'Particularly Large' Wave of Junk Bond Defaults Ahead. *CNBC.com.* Retrieved June 3, 2018 from https://www.cnbc.com/2018/05/25/moodys-warns-of-particularly-large-wave-of-junk-bond-defaults.html

[92] *Ibid.*

8.0 CONCLUSION

Stock buybacks have become an ever-growing factor in corporate finance today. Although the payment of dividends is still a major tool used to provide returns to shareholders, companies have been attempting to boost stock prices via share repurchases. If executed appropriately, share buybacks should provide a tax efficient return to shareholders without causing a taxable event. Nonetheless, there are other factors that could cause a company to buy back its own stock, such as preventing a hostile takeover, meeting share requirements for employee stock options, or attempting to artificially boost EPS. This paper analyzed the abnormal return on both stock price and the credit default swap spread, for a sample of S&P 100 firms, in the wake of a stock buyback announcement. To the author's knowledge, no other paper makes a comparison of the impact of a stock buyback announcement on both the equity share value and the credit default swap spread exclusively for S&P 100 mega cap firms.

S&P100 companies were analyzed, as those firms are regarded as high quality mega caps. Yet, since a selected firm must have both an active stock quote and a credit default swap spread, the group of available companies narrowed considerably. A total of 53 firms were included in the study, with many having multiple stock buyback announcement dates. ARs for 133 event dates were included in this paper. Thus, the study analyzed stock price and credit default swap behavior over a total of 2,926 trading days.

To test significance, a mean difference test was used for average AR and cumulative average AR for stock price. The findings indicate that there is a statistically significant positive average AR, in the stock prices of the selected entities on Day 0. Thus, null hypothesis #1 is rejected. In addition, the cumulative average AR remains positive and statistically significant until Day 6, suggesting that stock buyback announcements have an impact over the short-term.

This indicates that null hypothesis #2 can be rejected. Yet, beyond that, there is no evidence that the cumulative average AR is different from zero.

Furthermore, univariate and multivariate regression models were prepared using AR and cumulative AR, for each event, as dependent variables. The univariate model only included the log of buyback percentage, while the multivariate model included log of buyback percentage, year-over-year EPS growth rate, percentage of retained earnings in the capital structure, debt ratio, year-over-year revenue growth rate, cash-to-sales ratio, Tobin's Q, and free cash flow growth rate. A few of these variables came from a 2010 study by Michel, Oded, and Shaked. With the exception of the debt ratio and the cash-to-sales ratio, all of these control variables were deemed statistically significant, at varying degrees. This is further supported by the results for cumulative AR on Day 1. Therefore, all null hypotheses for equity were rejected at the 1% level, signifying that stock buyback announcements, on average, are associated with significant, positive ARs.

With respect to CDS, there is an initial, statistically significant positive average AC on the event date, resulting in the rejection of null hypothesis #6. However, average AC for CDS spreads is far more volatile than equity, and statistical significance, both positively and negatively, occurs intermittently between Day -1 and Day 12. For a deeper analysis, a univariate and a multivariate regression model was prepared using AC and cumulative AC in CDS as the dependent variable. All of the previously mentioned independent variables were used as controls. Although statistical significance was observed on the event date, based on the mean difference test, further validation of the results cannot be determined from the subsequent regression models. Thus, all other null hypotheses for CDS cannot be truly rejected. Nonetheless, there are enough findings to support additional research in this area as a future study.

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