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Investment Performance, Importance of Cash Levels, and  
Descriptive Company Statistics for U.S. Buybacks

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**Abstract**

An investment strategy based on buying U.S. stocks announcing share repurchase programmes over the period 1999 to 2014 suggest a minor long-run positive drift, with differing significance levels dependent on the test model. In descriptive terms, buyback activity is pro-cyclical and buyback companies are overrepresented among large-cap stocks that are less CapEx intensive and hold higher levels of cash on their announcement date. In contrast to the notion that insiders buy back stock based on market undervaluation, I contend the majority of buybacks are a flexible and innocuous means of deploying excess cash. Although buybacks can be interpreted as conservative, they express insider confidence in share prices and outlook on cash flows. However, I advise the investor to avoid exceptionally cash-rich stocks. These firms are more likely to choose buybacks simply to act on a build-up in cash, a rather mundane capital allocation decision considering its alternative use.

**Programme:** *Graduate School - Master of Science in Finance*

**Supervisor:** *Conny Overland*

**Keywords:** *Buybacks, buy-and-hold returns, excess cash*

2018-05-24

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**Acknowledgements:** *I would like to thank my supervisor Conny Overland for his time and commitment during the spring semester. Most helpful was the professor's ability to take a different point of view and challenge my reasoning. I would also like to thank my classmates for their motivational presence in the finance lab. Spirit cannot be understated during the countless hours locked inside a windowless room. Finally, I would like to thank my family for their loving support and guidance during my many years as a student.*

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# 1 Introduction

Open-market share repurchase programmes, or “buybacks” in laymen terms (will be used interchangeably throughout the thesis), refer to publicly listed companies buying back their own common stock at the current market price. In the United States (U.S.), buybacks are common practice today but they were rather uncommon before the 1980s. As they grew in popularity the academic world started to study them and found a positive abnormal price drift following repurchase announcements for several years, a clear contradiction to the efficient market hypothesis (EMH). The most cited articles attribute the price drift to insiders' ability to correctly identify their stock as undervalued. As an investor, I often come across companies buying back stock but I never consider *undervaluation* to be the motive of management. The earlier and heavily cited articles are becoming outdated as their security sample are from the 80s and early 90s. In this paper I study U.S. repurchase announcements in the 21st century to see if the price drift is still present. I hypothesize that the drift is no longer significant because buybacks have become considerably more common and they are motivated by other reasons, effectively dwarfing firms motivated by undervaluation. In theory the market should have corrected the inefficiencies laid out by the academic community.

I also examine additional company characteristics and economic conditions that help to explain abnormal returns and motivation for buying back stock. For example, I hypothesize that a build-up in cash is a motive for buybacks. On the basis of my findings, investors can better assess a share repurchase announcement made by a specific company in contrasting economic conditions.

## 1.1 Dividends versus buybacks

For portfolio managers and private investors common stocks continue to be a main ingredient and cornerstone to an investment portfolio. There exist an abundant number of stock-picking strategies, and one that continues to have a substantial following is screening for stocks with consistent and growing dividends. Investors may favor such a feature since dividends contribute as a source of income and they signal company stability. Cash dividends are typically a fixed percentage of a company's earnings distributed to shareholders at predetermined dates set by the company's board of directors.

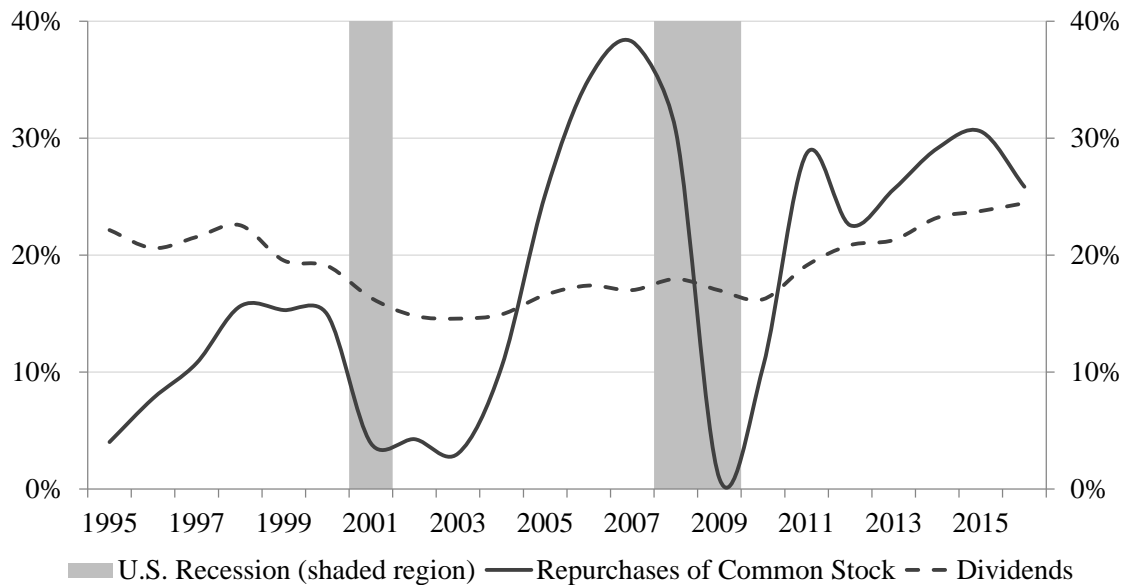
Buybacks are a second method of disbursing cash and simultaneously rewarding devoted shareholders. Buybacks grew exponentially after an SEC rule-change<sup>2</sup> in 1982 that simplified and encouraged open-market share repurchase programmes. In comparison to

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<sup>2</sup>SEC Rule 10b-18 protects share repurchase programmes from the anti-manipulative provisions of the Securities and Exchange Act of 1934, Grullon & Michaely (2002). Buybacks would likely have become even more popular had not the U.S. government increased the capital gains tax rate in 1986 to partially eliminate the discrepancy between capital gains taxes and dividend income taxes.

dividends, buybacks are more flexible and come with little punitive costs should they be discontinued. This stands in stark contrast to dividend-cuts that are known to be a big red flag in the investment community. In addition, buybacks may be preferred to the investor since capital gains taxes can always be deferred by not selling any shares, whereas dividends are taxed upon receipt. And by not selling any shares, the investor owns a larger share of the company and its future earnings. As we can see in figures 1 and 2, buybacks are vastly more pro-cyclical than dividends which confirm the intuition that buybacks are a flexible means of deploying excess cash.

**Figure 1: S&P 500 Non-financial firms**  
 % of cash flows from operations (median firm for item and year)



Sources: Thomson Reuters, Bloomberg Terminal, author's own calculations

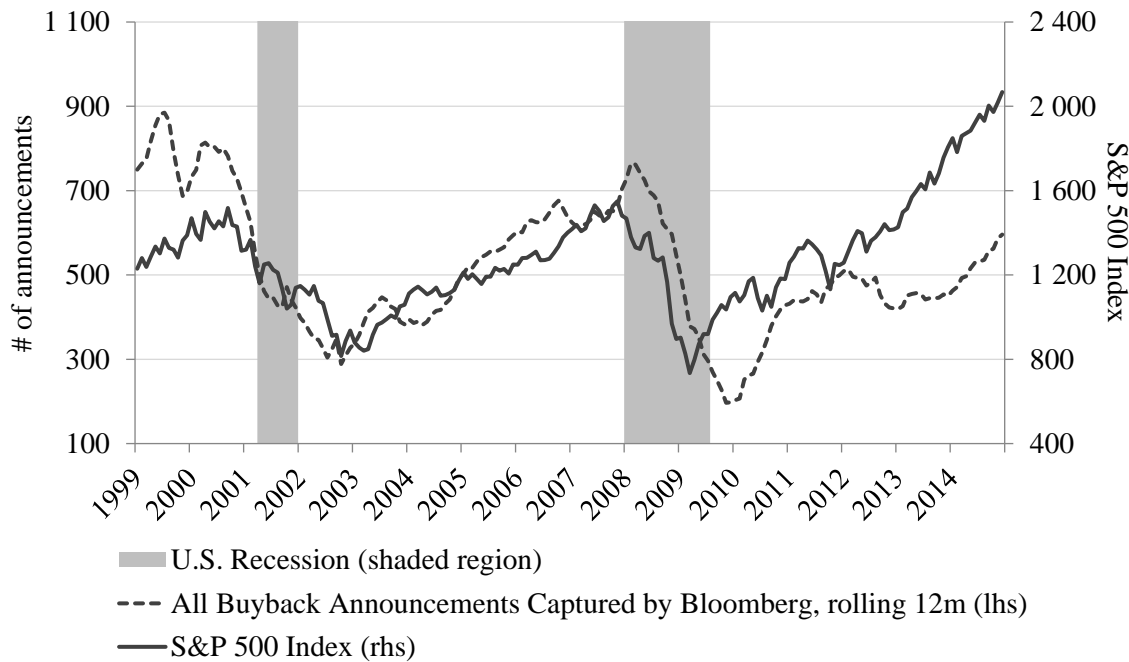
Description: To mitigate lookback bias, I change the constituents of the S&P 500 every year by downloading the member list at the end of each year (1995-2016). The typical cash flow statement starts with either net-or operating income, followed by cash flows after operating, investing and financing activities. At the end of the cash flow statement we find changes in the company's cash balance. Dividends and common stock repurchases are found under financing activities.

Figures 1 and 2 indicate that insiders are more likely to repurchase stock when the economy is sound and profits and valuations are high. With buybacks being pro-cyclical it would be surprising to find undervaluation as the main motive for insiders buying back stock. The undervaluation motive would be more credible if repurchase programmes were announced during economic downturns. These are times when cash is scarce and markets in general tend to become overly pessimistic (spending cash on buybacks in such conditions would signal a resolute belief in undervaluation). Instead, I find a minor positive long run drift where the announcements made during expansionary economic conditions outperform

those made during recessions<sup>3</sup>.

In support of practical reasons for buying back stock, I find that buyback companies experience a build-up in cash and tend to hold higher levels of cash at their announcement date compared to peers. But in support of the undervaluation hypothesis, cash-poor companies outperform cash-rich companies, a likely consequence of cash-poor companies being more confident in their share price and general business outlook. It may simultaneously be that the very “richest” of firms inadvertently indicate a lack of investment opportunities pursuing buybacks.

*Figure 2: Share-repurchase announcements vs. the S&P 500*



Sources: *Bloomberg Terminal, author's own calculations*

Description: The number of announcements are collected from the NYSE security sample pulled at the beginning of every year between 1999 and 2014 (see section 4.1).

## 2 Theory

Below I summarize the different theories and hypotheses drawn from the literature review related to open-market share repurchase programmes. The first four items are credited to Chun et al. (2010):

1. **Undervaluation hypothesis** - companies repurchase shares to signal private information that the shares are undervalued. As earlier articles have found, abnormal returns are expected to be positive.

<sup>3</sup>As indicate by The National Bureau of Economic Research (NBER).

2. **Excess cash hypothesis** - buybacks represent a more flexible way of distributing temporary cash compared to dividends. Direction of returns is inconclusive.
3. **Takeover deterrence** - repurchases can increase stock prices and decrease the interest of potential raiders. A repurchase programme will also allocate a larger ownership stake to managers and devoted shareholders - parties that are unlikely to sell shares. In theory, I would expect positive abnormal performance for companies buying back stock based on takeover deterrence since insiders should only pursue such a preventive strategy if they thought their shares were worth more than a potential raider's bid. Insiders should welcome an acquirer if they are willing to pay a hefty premium, unless insiders are emotionally tied to the company and highly value the control premium.
4. **Optimal leverage ratio** - with a build-up in cash, certain leverage metrics such as *net* debt decreases which may be undesirable because companies typically have a targeted capital structure. Insiders know that the capital structure affects intrinsic value through the cost of capital and via the income statement tax-shield. Buybacks also reduce equity through the cancelling of shares which can increase leverage metrics such as debt-over-equity. Higher leverage would also decrease the interest of raiders, similar to the takeover deterrence hypothesis.
5. **Jensen's agency hypothesis** - outlines the divergence of interests between owners and managers. Capital allocation decisions is entrusted to management by its owners (shareholders) and it is one of management's most important tasks. But since allocating capital is not a quantifiable skill, owners may have trouble appraising management. Knowing this, insiders may be inclined to decide on capital allocations based on self-interest, such as spending on perquisites or arbitrary investments, and acquiring for sheer size regardless of implications on intrinsic firm value.  
  
Integrating Jensen's theory with the motives for buybacks, managers that opt for buybacks may exhibit better self-control since buybacks are more conservative and do not provide insiders with an immediate reward. These disciplined managers may execute superior capital allocation decisions which subsequently has a positive effect on intrinsic value. Thus, Jensen's theory in the context of buybacks implies that any abnormal positive price drift can instead be attributed to managerial talent.
6. **Lack of investment opportunities** - if a company cannot find lucrative investment opportunities for a growing cash pile, either internally or through M&As, buybacks may be the next-best alternative. However, a lack of investment opportunities may be a red flag for investors since growth prospects can be interpreted as limited. The direction of abnormal returns is inconclusive.

7. **Option-funding hypothesis** - repurchasing shares enable companies to realise employee stock options and it simultaneously prevents the dilution of simple earnings per share (EPS). Should have no abnormal effect on prices, Kahle (2002).

As can be seen many of the hypotheses overlap and it can be difficult to separate one theory from the other in empirical studies on abnormal returns. My article mainly challenges the undervaluation hypothesis and tests the importance of cash levels in the context of the excess cash hypothesis. I do not control for any of the other hypotheses and I do not analyse the option-funding hypothesis or takeover deterrence. But I do reference to the lack of investment opportunities, Jensen's agency hypothesis and the optimal leverage ratio because of their relevance to the use of cash.

## 2.1 Traits of undervaluation

If undervaluation is the motive for a sufficient number of repurchase firms I expect to find descriptive evidence in my sample. For example, there are certain accompanying traits which the academic literature highlight and which in theory should be evident, including (i) stronger abnormal returns for companies infrequently announcing buyback programmes, and (ii) stronger abnormal returns for small-cap and value stocks.

- (i) In a *nearly* efficient market misprings are rare and therefore companies that infrequently announce share repurchase programmes should be more likely motivated by undervaluation. In comparison, consistent mispricing touting from insiders would not be taken as a credible signal by the market. It is more likely that frequent buyback practitioners have adopted repurchase programmes as an integral part of their capital allocation composition, and buy back stock regardless of market movements.
- (ii) From the literature review there is a consensus that the strongest outperformance stem from small-cap and value stocks, where infrequent announcement companies are typically made by small-value stocks (Ikenberry et al. (1995), Lakonishok & Vermaelen (1990) and Jagannathan & Stephens (2003)). These findings go hand-in-hand with long-term studies of equity returns, such as Bauman et al. (1998) who show that value stocks outperform growth, and small-cap outperform large-cap. A common explanation of such features in equities are that small-cap stocks may be overlooked by investors and typically have less analyst coverage which lead to more undervalued cases, and investors typically overpay for growth stocks by extending past trends. In this context undervaluation is more common for value and small-cap stocks and thus provide management of those companies with more opportunities to use buybacks to signal market mispricings.



### 3 Literature Review

#### 3.1 The undervaluation hypothesis

Among the most cited and earliest studies of market signalling via buybacks comes from Vermaelen (1981). Vermaelen (1981) finds that repurchase announcements are followed by permanent increases in stock prices and he attributes his findings to the signalling hypothesis, also known as the undervaluation hypothesis. Following Vermaelen (1981), there are both numerous studies that support the undervaluation hypothesis, but also those that either object to the methodology or find other motives for buying back stock. Unless specified, all articles below analyse the U.S. market.

Comment & Jarrell (1991) find support of the undervaluation hypothesis during the announcement period in its study of open-market share repurchase programmes between 1985 and 1988. They find the strongest effect for larger programmes (as percent of outstanding shares), where a larger commitment of capital signals higher conviction from insiders. Perhaps the most persuasive study comes from Ikenberry et al. (1995) who study repurchase programmes during the period 1980-1990. They find an average abnormal four-year buy-and-hold return of 12.1% with the majority of the outperformance captured among value stocks, defined as those with low price-to-book ratios. In explaining the long-run price drift, Ikenberry et al. (1995) suggest that the market must underreact to a significant portion of repurchase announcements. Their findings hence violate EMH theory (EMH theory requires any mispricing to immediately be adjusted for at the time of the market signal, i.e. repurchase announcement).

Chan et al. (2004) extend the same sample as Ikenberry et al. (1995) and they also find that the market reacts more favorably to repurchase announcements by value stocks. In addition, Chan et al. (2004) find stronger results for firms that commit to their repurchase programmes and actually buy back shares. Keep in mind that a simple repurchase announcement does not obligate the company to go through with any repurchasing activity. However, there are strong incentives for insiders to go through with the repurchase programme because it is valuable for them to appear credible to stakeholders. Lastly, Chan et al. (2004) find a stronger reaction for firms with lower preannouncement returns. This can be put in connection with De Bondt & Thaler (1989) who find evidence of mean-reversion in equity returns, and Thorndike (2012) in his book *The Outsiders*, where a collection of unconventional CEOs use buybacks at times when the market is generally depressed or negligent to their stock. In line with De Bondt & Thaler (1989), if prices mean-revert after having been irrationally depressed or exuberant, it provides insiders with an opportunity and motive to buy back stock based on undervaluation.

Further support of the undervaluation hypothesis comes from Dittmar (2000) who contends that undervaluation is the most consistent motive for share repurchases, but it is not

the only motive (Period 1977-1996). Yook (2010) examine 9,551 repurchase programmes between 1994 and 2007 for firms listed on the major U.S. exchanges. Yook (2010) distinguish between firms that actually repurchase shares, similar to Ikenberry et al. (1995), but also between seasoned repurchase firms that frequently buy back stock, and those that infrequently announce repurchase programmes. In support of the undervaluation hypothesis, Yook (2010) finds strong evidence of long-term abnormal returns for infrequent announcers that actually buy back shares, similar to Chan et al. (2004). Jagannathan & Stephens (2003) also find that infrequent repurchases receive a much stronger positive reaction.

And lastly, Yook (2010) use a calendar portfolio regression method whereas the earlier articles use either the buy-and-hold return approach (BHR) or cumulative abnormal return approach (CAR). The undervaluation hypothesis therefore gain additional support since Fama (1998) argues that by implementing a calendar approach, as Yook does, abnormal returns should diminish from the previous BHR/CAR studies.

### **3.2 Alternative studies**

With the emergence of articles in favor of the undervaluation hypothesis there naturally arose opponents. Kahle (2002) indicates that the market is efficient in that there is no abnormal performance for firms buying back stock to fund employee stock options. Kahle (2002) goes on to explain that the innovation in compensation policy led to the growing use of employee stock options during the 1990s, which partially can explain the rise in buyback activity during the same time period. Putting this into numbers, in a survey of 2000 U.S. companies, Sanford C. Bernstein & Company found the value of stock options grew from 8.9 billion to 45.6 billion dollars between 1992 and 1997, Stregre (1999). Similarly, Grullon & Michaely (2002) find that expenditures on share repurchase programs, relative to total earnings, increased from 4.8% to 50.1% between 1980 and 1998. Grullon & Michaely (2002) attribute the rise in buybacks to relaxed regulation, notably SEC Rule 10b-18. The findings by Kahle (2002), Grullon & Michaely (2002), along with Dittmar (2000) and Brav et al. (2005), support the option-funding hypothesis in that firms repurchase shares to avoid the dilution of incumbent shareholders and of basic EPS (see next paragraph).

Bonaimé & Ryngaert (2013) draw inspiration from Kahle (2002) in regards to employee stock options and challenge the undervaluation hypothesis with their findings that share repurchases are *most frequently observed conditional on insiders being net sellers*. If stock prices truly are undervalued there is no compelling reason for insiders to simultaneously be selling their privately-held shares. Bonaimé & Ryngaert (2013) argue share repurchases are undertaken to support prices in the short-run which allow insiders to sell at favorable prices. During the share repurchase programme, they also find higher levels of options exercised by insiders. Similarly, Chan et al. (2010) tries to single out such “suspect firms” as those who authorize share repurchases in an attempt to convey a false signal to the market. This

tactic may be implemented by managers that are seemingly under pressure to boost stock prices. They also find their “suspect” managers to have higher exposure to stock options. All in all, Bonaimé & Ryngaert (2013) show that investment strategies based on share repurchase activity are only successful when insiders are net buyers - a testament of insider commitment.

On the topic of dividends versus buybacks, Dittmar (2000) argues buybacks are not a replacement for dividends since repurchasing firms do not pay lower dividends. Brav et al. (2005) explain how the flexibility of buybacks allow managers to alter its payouts to shareholders in response to available investment opportunities and how buybacks can be used to time the equity market and directly increase earnings per share. In fact, Brav et al. (2005) find that CFOs are very conscious of how share repurchases affect EPS. This is rather surprising since EPS is an arbitrary ratio in the context of firm value. But changes in EPS directly affect price-earnings (P/E) ratios (buying back stock will increase EPS and lower the P/E-ratio). P/E-ratios are widely observed by the market and investors may screen for lower P/E-ratios in relative investment bets. The CFO knows this and expects a lower P/E-ratio to entice investors and support share prices.

Lam et al. (2013) analyse the general relationship of cash and equity returns and comment on the opposing conclusions presented by earlier studies. A few papers argue that riskier firms hold more cash and therefore investors will expect *higher* returns. Other papers argue that higher liquidity *lowers* risk and expected returns. In their own paper, Lam et al. (2013) find a positive relationship between cash holdings and returns. They identify higher cash holdings as a proxy for macroeconomic risk and argue that higher liquidity is deliberate and necessary for these firms since they face higher default risks. On a different note, Lam et al. suggest that firms with an abundance of cash might subsequently increase dividends. Such an action will send share prices higher, assuming the market was not expecting an increase.

## 4 Data & Methodology

### 4.1 Data

My sample consists of 3068 common stocks that collectively are pulled at the beginning of each year from the New York Stock Exchange (NYSE) between 1999 and 2014 (duplicates are removed). For each year, the investor's security universe is limited to securities available on the NYSE at the beginning of said year and I will refer to this restriction as the *mark*-assignment rule. The mark-assignment rule helps mitigate survivorship bias and skewness bias, both common irritants in long-run studies, Lyon et al. (1999). Survivorship bias is evident in indices, such as the S&P 500 Index, where the smallest companies are replaced as they cannot keep up with the general growth of the market. At any point in time I

want to include these “drop-outs” in the investor's buyback portfolio and corresponding benchmarks to better resemble the investor's real-time performance. Skewness occurs since returns can only fall by 100 percent, but they can go up infinite. The construction of my sample alleviates skewness since the NYSE has specific listing requirements for securities such as minimum share price and minimum market capitalization. The mark-assignment rule thus creates a rolling sample that will exclude the very smallest of firms with the lowest absolute share prices, stocks likely to enlarge skewness bias.

#### 4.1.1 Sources

Repurchase announcements are downloaded from the Bloomberg Terminal<sup>4</sup> and each announcement date is replaced with the month and year in which it occurred. All returns, market capitalization, total equity and other items are downloaded from Thomson Reuters.

#### 4.1.2 Issues

Since my data is pulled from Thomson Reuters and Bloomberg it may decrease the comparability to previous studies that almost always use data from CRSP (the Center for Research in Security Prices). I confine my study to the NYSE whereas CRSP data include securities from NYSE, NASDAQ and AMEX. It is therefore likely that my data is inferior in that CRSP has a vaster set of data.

## 4.2 Method

In method I apply the buy-and-hold return approach, BHR, a common method which closely resembles the investor experience as returns are compounded and measured over long time intervals (usually in years). From the literature review both Ikenberry et al. (1995), Chan et al. (2007) and Chan et al. (2004) use the BHR method as their main test model. Other empirical methods include the cumulative abnormal returns method, CAR<sup>5</sup>, and the calendar-time portfolio regression approach, CTIME<sup>6</sup>. I choose the BHR approach because it is more intuitive from the investor's point-of-view, but due to the risk of model issues, I cross-check my results with a CTIME approach, the Fama-French three-factor model. Recall from the literature review that Fama (1998) argues long-run return

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<sup>4</sup>In the terminal: Corporate Actions - Action Type - Capital Change - Stock Buyback. Use Bloomberg field id STOCK\_BUYBACK\_HISTORY in Microsoft Excel. Note: Bloomberg has only actively sought out share repurchase announcements since 1997.

<sup>5</sup>In the CAR approach abnormal returns are usually measured during shorter time intervals (daily, weekly, monthly) against a benchmark and subsequently aggregated over time. Conrad & Kaul (1993) show that single-period returns are upwardly biased in using cumulative raw returns. The two state that *the appropriate measure of performance should be the buy-and-hold return over long intervals* as it reduces the statistical bias present in cumulative performance measures.

<sup>6</sup>The CTIME approach is also known as Jensen's alpha, where the alpha is the excess return that cannot be explained by a factor model.

studies are sensitive to the adopted methodology, and abnormal returns tend to diminish or disappear when a CTIME approach is used.

In the BHR approach, the investor will buy stocks that have had a share repurchase programme announcement in the preceding month, starting with announcements made in January 1999 and ending in December 2014. This results in 192 portfolios (12 months x 16 years), or *runs* as I will call them. The investor will hold each buyback portfolio for 3 years where returns are equally weighted<sup>7</sup>, and measured in 12 month increments. This rebalancing of sorts diminishes the effects of outliers, i.e. stocks that perform extraordinarily well. I exclude companies with negative equity from the P/B quantiles, where price-to-book is measured by dividing market capitalization by total equity. When securities are delisted, a result of either bankruptcy, hostile takeovers, friendly mergers etcetera, the investor's return for that security is based on the last available price. For compounded returns, the investor's profit/loss on a delisted security is reinvested into the buyback portfolio at the next rebalancing opportunity which occur every 12 months. Equation 1 is a modification of Lyon et al. (1999) compound portfolio returns,

$$R_{s\tau}^j = \prod_{t=s}^{s+\tau} \left[ 1 + \frac{\sum_i^{n_t} R_{it}}{n_t} \right] - 1 \quad (1)$$

where  $j$  represents buyback portfolios 1 through 192,  $s$  is the beginning period,  $\tau$  is the period of investment (measured in 12 month increments, I measure portfolio performance 12, 24 and 36 months forward),  $R_{it}$  is the total return on individual security  $i$  over 12 month period  $t$ , and  $n_t$  is the number of securities in period  $t$ .

In measuring abnormal returns I compare the total returns for each *run* with that of an appropriate benchmark. In constructing a benchmark for each *run*, my sample is divided into five quantiles for both size and price-to-book ratios. Quantile values range from 1 through 5, where 1 represents small-cap and low P/B  $\equiv$  value stock. By combining these two parameters I form 25 (5x5) reference portfolios where the first integer represents size and the second integer represents valuation. The size-valuation reference portfolios range from #11 - small-value, #12, #13, #14, #15, #21... to portfolio #55 - large-growth (note: there are no portfolios that begin or end with the integers 6, 7, 8 or 9). These reference portfolios are combined to resemble each buyback portfolio in terms of size and valuation. For example, if half of the members of a buyback portfolio come from reference portfolio #35 - midcap-growth, so must also the benchmark be weighted. I also remeasure size and valuation quantiles at each rebalancing opportunity in order to reflect changes among

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<sup>7</sup>Fama (1998) argue that asset pricing models such as the BHR have systematic problems explaining average returns for small-cap stocks, and find that return anomalies typically shrink and often disappear in long-term post-event studies when event firms are value-weighted rather than equal-weighted. I still choose the equal-weighted approach because the investor in buyback firms should not care about firm size. I control for any size-effect with matching benchmarks by size and valuation quantiles.

the members of the buyback portfolio. This will enhance the comparability between each buyback portfolio and corresponding benchmark over time. Abnormal returns are then calculated as follows:

$$AR_{\tau}^j = R_{\tau}^j - E(R_{\tau}^j) \quad (2)$$

where  $AR_{\tau}^j$  is the  $\tau$  period buy-and-hold abnormal return for buyback portfolio  $j$ ,  $R_{\tau}^j$  is the  $\tau$  period buy-and-hold return for buyback portfolio  $j$ , and  $E(R_{\tau}^j)$  is the  $\tau$  period expected return. Expected returns represent the equivalent mixture of reference portfolios that form each benchmark.

The reference portfolios do not include any company that has had a share repurchase announcement in the last 24 months, or will have in the next 12 months. These exclusions are done to keep observations independent between groups. If there truly is an announcement effect and an underlying price drift after a repurchase announcement, excluding surrounding repurchasing firms from the benchmarks should enhance the difference in returns. The specified exclusion range is chosen since I would expect companies with an announcement 24 months ago to carry on a positive price drift, and the cap 12 months forward is chosen since those firms are likely to have an announcement effect and a price drift up until the next return measurement. However, the results are negligible in running the same data without the independent groups criteria. This is the result of a large enough sample where excluding a small number of securities does not dramatically change equally-weighted returns.

In measuring preceding returns, or momentum, I only exclude the selected repurchase firms for each *run* from the benchmarks. Momentum is treated differently since the buyback firms have not yet announced a repurchase programme, and should then be compared to the entire sample.

#### 4.2.1 Method for individual securities

In order to study specific company characteristics among buyback firms I analyse my sample on an individual level as well. In measuring momentum, each security is compared to its size-valuation reference portfolio 24 months before its announcement, and in measuring forward returns, size and valuation quantiles are measured at the time of the announcement. Similar to portfolio measurements, I implement the mark-assignment rule and exclusion of surrounding repurchase announcements (24 months lagging, 12 month forward).

#### 4.2.2 Additional parameters

Beyond the characteristics size and valuation, I analyse the significance of cash holdings and capital expenditure (“CapEx”) intensity at the time of each announcement, and also the development of these parameters surrounding each announcement. I choose to examine

CapEx because it is another major cash flow item that is strategically decided upon, similar to buybacks.

## 5 Results

### 5.1 Investment performance

I find on average a 1.0%, 2.3% and 4.1% abnormal positive return drift for a one-, two- and three-year buy-and-hold investment strategy, respectively, buying all firms with a repurchase announcement within a given month between 1999 and 2014. These returns do not incorporate any announcement effect which Comment & Jarrell (1991) and Ikenberry et al. (1995) find to be approximately 2% and 3.5%, respectively. The results of the BHR model are significant in a bootstrap approach but the significance diminish using a CTIME model (although results are similar). In regards to my initial hypothesis of *no* long-run positive price drift, I appear to be in a twilight zone as my two test models yield different significance levels. This prevents me from either confirming or rejecting my hypothesis with absolute certainty. However, if transaction costs were included, I expect the positive drift to diminish further and I expect no abnormal returns from an investment strategy buying securities based on repurchase announcements.

From 1999 through 2014 there are times where the investment strategy would work significantly better or worse, from an average low -18.8% three-year buy-and-hold investment horizon in year 2005, to a high of 20.3% in year 2000. The periodicity is however not random and the investor should pay attention to market conditions as I find an odd difference for repurchase announcements made in economic expansionary<sup>8</sup> periods (above average real GDP growth) and contractions<sup>9</sup>. Three-year abnormal returns are significantly positive buying stocks in expansionary periods, but insignificant and negative during recessionary periods, a finding that contradicts evidence that managers possess “timing” abilities.

I would expect the most skilled managers to be among those that announce repurchase programmes during depressed equity markets. As Thorndike (2012) illustrates in his book where his unconventional CEOs use buybacks at times when equities are under pressure or their stock is out of favor. These few contrarian managers appear capable of correctly valuing their business and can effectively “time” the market. But these managers are rare, and the discrepancy in returns from my study between expansionary and recessionary periods, in conjunction with figures 1 and 2, where we see the majority of companies pursuing buybacks in buoyant economic conditions, all suggest that insiders are no better at valuing their business than market participants.

<sup>8</sup>Above GDP Trend are months where real GDP growth is above the quarterly average between 1990 and 2014 - a period of consistently low interest rates, and ends with my study period.

<sup>9</sup>As indicated by the NBER, recession dates start at the peak of a business cycle and ends at the trough.

Instead, it may even suggest that some insiders underestimate their exposure to economic downturns and completely mistime the market in their use of buybacks. From one perspective, buybacks could be interpreted as an optimistic liquidity signal, as the company displays confidence in spending cash. But the disbursing of cash also increases leverage through higher *net* debt ratios which can trigger downgrades in credit ratings and lead to stricter lending terms. Such a turnaround is quite damaging on share prices, especially during a downturn in the economy. Buybacks in recessions may also be a waste of cash since M&A bargains and other lucrative investment opportunities present themselves through forced fire-sales (happens when a seller of assets has limited time in finding a buyer and must settle for a discount).

## 5.2 Descriptive analysis

Inconsistent with previous literature and theory, I do not find the “outperformance” to be attributed to small-cap or value stocks. Also drawn from the theory section, it is not evident from my sample that firms that infrequently announce repurchase programmes exhibit stronger returns, even though articles by Yook (2010) and Jagannathan & Stephens (2003) proclaim infrequent announcers are more likely motivated by undervaluation. In contrast, I find that occasional announcements (defined as those without a previous announcement lagging 48 months) have a negative 1.9% abnormal return for the three-year buy-and-hold investment strategy, whereas frequent<sup>10</sup> announcers portray positive returns (both insignificant). Likewise, the occasional small-value stocks exhibit negative abnormal returns, on average, while frequent large-growth stocks exhibit positive abnormal returns (stocks with the complete opposite characteristics). Empirically, it may be that frequent announcers return resilient cash flows which enable them to continuously buy back stock. The market may not fully appreciate the recurrence of buybacks, and share prices would then exhibit a positive long-run drift.

The only finding that can support the notion that infrequent announcers are more likely to repurchase based on undervaluation can be found in tables 1 and 2 which show that genuine (defined as announcements without a previous repurchase announcement in the last 24 months) and occasional announcements much more resemble the entire NYSE sample, in contrast to frequent announcers that are overrepresented in large-cap and growth stocks, and underrepresented in small-cap and value stocks. As frequent announcers diverge quite strongly from the distribution of the NYSE sample, it suggest that certain company characteristics found among frequent announcers increase their propensity to buy back stock. In contrast, infrequent announcement firms have a more neutral distribution by size and valuation which eliminates certain company characteristics from consideration and

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<sup>10</sup>Frequent announcements are the byproduct of removing genuine announcements from all announcements. Genuine announcements do not have a previous repurchase announcement in the last 24 months.



suggest there are other motives for these firms buying back stock, such as undervaluation.

**Table 1: Distribution of repurchase announcements by Size and P/B quantiles**

		All Announcements		Frequent Announcements		Genuine Announcements		Occasional Announcements	
<b>Size</b>									
<i>Small</i>	(1)	735	12%	279	9%	351	15%	129	14%
	(2)	948	15%	401	13%	416	18%	184	21%
	(3)	1181	19%	563	19%	470	20%	175	20%
	(4)	1564	25%	749	25%	539	23%	201	22%
<i>Large</i>	(5)	1943	30%	1049	34%	573	24%	205	23%
<b>P/B</b>									
<i>Value</i>	(1)	1054	17%	339	11%	435	20%	175	20%
	(2)	1099	18%	440	14%	444	20%	184	21%
	(3)	1177	19%	553	18%	441	20%	176	20%
	(4)	1434	23%	773	25%	467	21%	202	23%
<i>Growth</i>	(5)	1453	23%	936	31%	418	19%	157	18%

Sources: Thomson Reuters, author's own calculations

Description: The quantiles for market cap (size) and price-to-book (valuation) are assigned by dividing the sample into percentiles at the 20th, 40th, 60th, and 80th level. Percentiles for the sample are calculated monthly and the sample is limited to the mark-assignment rule.

**Table 2: Distribution of announcements - combining Size and P/B quantiles**  
The first & second integer represents size & P/B, respectively (1=small/low, 5=high/large)

Size-Valuation Combination		Entire NYSE Sample	All Announce.	Frequent Announce.	Genuine Announce.	Occasional Announce.
<i>Small-Value</i>	(11)	10%	6%	4%	8%	7%
	(12)	5%	3%	2%	4%	5%
	(13)	3%	2%	1%	2%	2%
	(14)	2%	1%	1%	1%	1%
<i>Small-Growth</i>	(15)	1%	0%	1%	0%	0%
<i>Large-Value</i>	(51)	2%	2%	2%	2%	2%
	(52)	3%	4%	3%	4%	3%
	(53)	4%	5%	4%	4%	3%
	(54)	5%	8%	10%	7%	7%
<i>Large-Growth</i>	(55)	7%	11%	15%	8%	8%

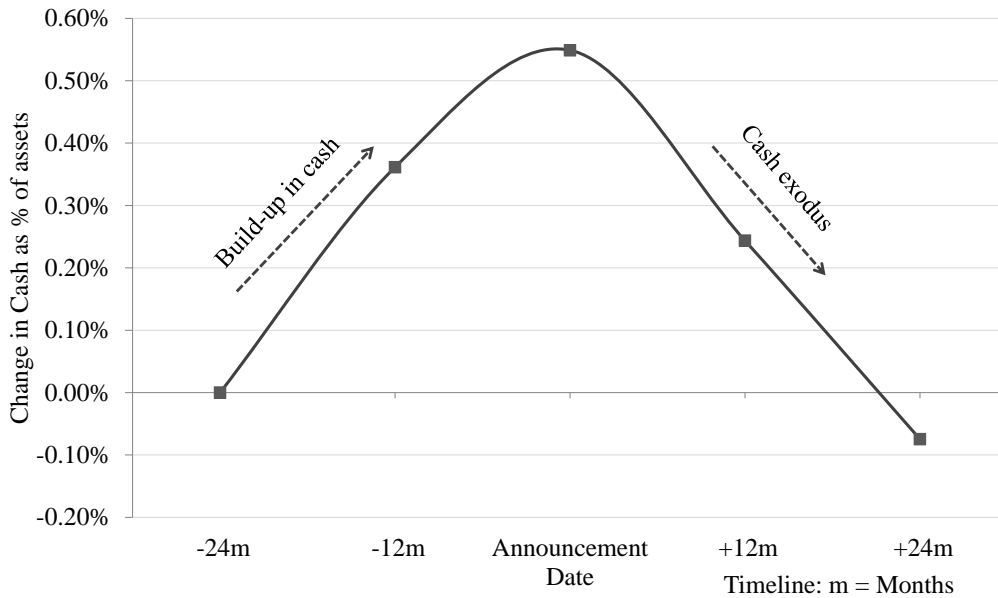
Sources: Thomson Reuters, author's own calculations

The excess cash hypothesis state that buybacks represent a more flexible way of distributing temporary cash compared to dividends. The following discussion will look at cash as percent of assets surrounding repurchase announcements, and contest the undervaluation hypothesis with the excess cash hypothesis.

At the time of share repurchase announcements, buyback firms tend to hold higher levels of cash as percent of assets compared to comparable firms. For the entire NYSE

sample (buyback and non-buyback firms), growth stocks and small-cap stocks tend to be more cash-rich. We also know that buyback firms are overrepresented among growth stocks, from table 1, which suggest that either cash-rich companies or growth stocks are more likely to pursue buybacks. I contend the former is the more causal relationship. Companies do not like hoarding cash and will want to disburse of its excess cash for productive use, deter raiders from hostile takeovers, and/or relever the company in order to regain its targeted capital structure, among others. If investment opportunities are scarce, a build-up in cash will nudge insiders toward buybacks. We can see in figure 3 that buyback firms experience a build-up in cash (momentum and cash build-up is correlated which reflects a prosperous business, i.e. there is a more pronounced build-up in cash among firms with strong price performance preceding an announcement). Subsequently, repurchase firms spend a portion of their cash on buybacks, forcing cash as percent of assets to revert back to normal.

**Figure 3: Abnormal changes in cash among buyback firms**



Sources: Thomson Reuters, author's own calculations

Description: I measure average cash as percent of total assets for all announcement firms within each month. For each monthly selection of securities, I measure the average cash as percent of assets twelve months and twenty-four months before and after the announcement month. The changes between periods (done for the entire study period 1999-2014) is corrected for any underlying changes in my sample of non-repurchase firms. This correction is necessary since average cash as percent of assets for the NYSE sample steadily increases over time and is pro-cyclical. Firms are limited to the mark-assignment rule as before.

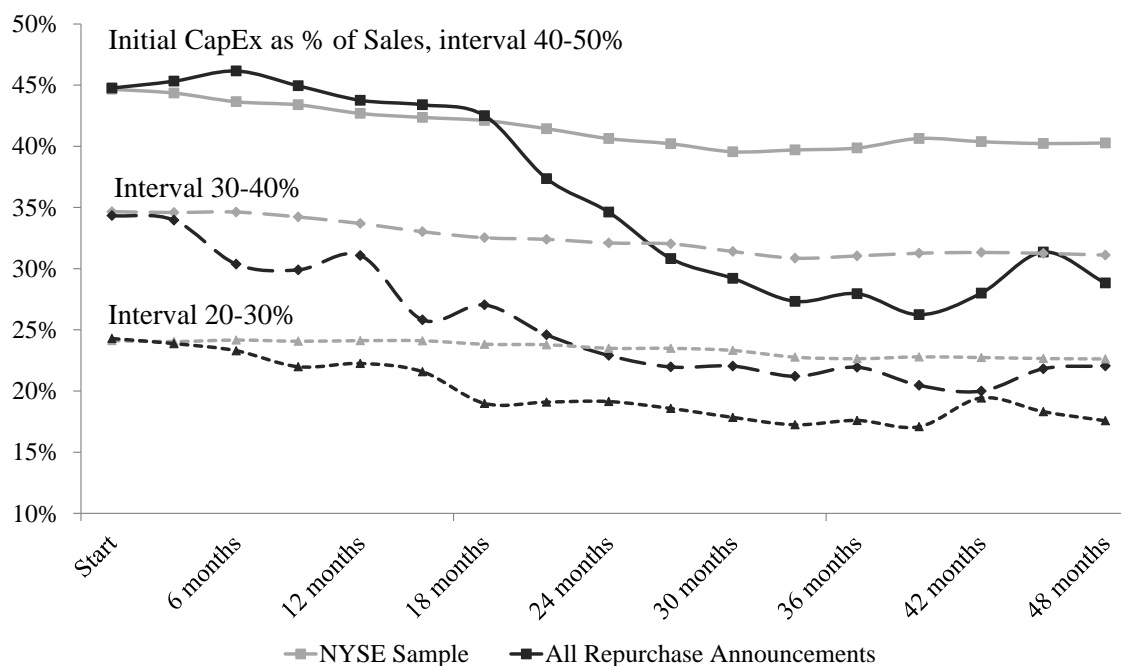
However, small-cap stocks are underrepresented in the buyback sample, even though smaller firms tend to hold higher levels of cash (the differences in cash holdings by market cap is less evident compared to difference in cash holdings by P/B-ratios). This stands in contrast to the earlier argument that cash-richness is a motive for pursuing buybacks. To

counter, I argue that small-cap stocks can more easily grow by reinvesting cash, whereas “mature” large-cap stocks require vaster and more complex projects to make a noticeable impact on their business. Therefore when large-cap stocks experience a build-up in cash, their investment options may be less impactful and buybacks would present a more flexible means of cash disbursement.

The descriptive analysis favors the excess cash hypothesis but it does not explain the underperformance of cash-rich firms (the coefficient for cash is significantly negative for abnormal returns, table 3). From the literature review, Lam et al. (2013) attribute higher cash holdings as a proxy for macroeconomic risks and investors should then expect higher returns. This proxy of sorts cannot be true for repurchasing firms because they choose to disburse of their excess cash, something an inherently risky firm would not consider doing. Instead, and in line with the undervaluation hypothesis, the negative relationship suggest cash-poor firms are more likely motivated by undervaluation, and are more confident in future cash flow generation. Another explanation could be that shareholders of cash-rich firms are disappointed with management's decision to pursue buybacks. Shareholders may interpret buybacks as a dull corporate action in contrast to reinvestment in the business or synergistic M&A.

Buyback firms are consistently less CapEx intensive compared to peers which may be one of the reasons they are more cash-rich and can divert more funds towards buybacks. I find that CapEx *intensive* buyback firms significantly underperform (the coefficient for CapEx is significantly negative for abnormal returns, table 3) and I also find a more prevalent decline in CapEx intensity after a repurchase announcement, compared to the mean-reverting tendency for all companies (see figure 4). This suggest CapEx and buybacks are partial substitutes to one another. I provide two hypothetical explanations to this occurrence: either insiders misjudge their cash flow capacity and are forced to cut down on CapEx (in part the consequence of having spent cash on buybacks), or current period CapEx is temporary. Those forced to cut down on CapEx indicate a distressed company and will likely have had poor share price performance.

**Figure 4: Development of CapEx as % of sales, period Dec 1996-Dec 2017**  
*Buyback firms tend to draw down on CapEx after a repurchase announcement*



Sources: Thomson Reuters, author's own calculations

Description: The average CapEx as percent of sales is measured for the entire NYSE sample and all buyback firms in intervals between 20-30%, 30-40% and 40-50%. I measure the development over 48 months, with monthly starting periods from December 1996 to December 2013. Figure 4 shows the median of the observations. For the entire sample, there is a mean-reverting tendency as firms draw down on CapEx as they exit a period of growth or return to a more sustainable investment rate. As figure 4 shows, buyback firms mean-revert stronger.

### 5.3 Significance testing

The performance of buyback portfolios does not tell much as to which companies pursuing buybacks perform better or worse. In order to find the performers and laggards, I need to test the significance of my chosen parameters on the individual security level. I run linear regressions on the individual security level and measure abnormal returns (the dependent variable) on the explanatory variables *Size* and *P/B* quantiles, cash as percent of total assets (*Cash*) in percentiles, CapEx as percent of sales (*CapEx*) and two-year compounded abnormal returns preceding the announcement (*Momentum*). Table 3 shows the three-year compound abnormal returns for the different assortments of share repurchase announcements.

**Table 3: Linear regressions for share repurchase announcements**  
*3-year compounded abnormal returns*

Security Sample	Coefficients					
	Constant	Size	P/B	Cash	CapEx	Momentum
All Announcements	8.9 (0.070)	-0.0 (0.971)	0.2 (0.830)	-10.0* (0.013)	-30.1* (0.046)	0.0* (0.018)
Frequent Announcements	6.5 (0.265)	0.4 (0.772)	-0.2 (0.838)	-5.6 (0.264)	-26.2 (0.253)	0.0 (0.184)
Genuine Announcements	13.8 (0.102)	-0.8 (0.629)	0.7 (0.689)	-17.3* (0.010)	-39.1 (0.051)	0.1* (0.032)
Occasional Announcements	-3.4 (0.771)	-0.2 (0.926)	2.5 (0.316)	-9.3 (0.343)	-35.5 (0.115)	0.1 (0.067)
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All, NBER Recessions	-31.5 (0.076)	-3.1 (0.383)	11.0* (0.015)	-0.2 (0.991)	9.8 (0.786)	0.1 (0.230)
All, > GDP Growth Trend	14.3* (0.049)	-0.9 (0.586)	-0.3 (0.857)	-13.8* (0.023)	-30.8 (0.196)	0.0 (0.447)

Sources: *Thomson Reuters, author's own calculations*

Description: *p-values; \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ ; Regressed in Stata, robust standard errors, 95% confidence intervals. Size and P/B are represented as quantiles. This is especially important for the size component since market cap tends to increase over time. Cash is represented in percentiles, where percentiles are measured monthly for the entire NYSE sample (restricted to the mark-assignment rule). Percentiles are used since cash as percent of assets rise over time in the sample. CapEx is represented as percent of sales. There is no need to adjust CapEx values over time because it remains rather stable. Momentum is the two-year compounded abnormal returns measured against the corresponding size-valuation reference benchmark, where the size-valuation quantiles are measured and assigned two years before the announcement. The constant represents the unexplained three-year compounded abnormal return. NBER recessions start at the peak of a business cycle and end at the trough. Above GDP trend are periods where real GDP growth is above average. The average is measured quarterly between 1990 and 2014. Those years have consistently low interest rates and goes through two full business cycles.*

Foretold by previous academics, the regressions in table 3 are questionable in their validity since traditional significance tests may not be applicable for multi-year compound returns. For example, Ikenberry et al. (1995) question the stability in return distributions, the skewness of share price returns and the clustering of observations in time. My sample likely violates both the normality assumption since share price returns are skewed in the long-run (share prices can only go down 100%, but they can go up infinite), and stationarity since return distributions are vastly different in bull versus bear markets. These issues are semi-controlled for by measuring abnormal returns in contrast to simple returns. Abnormal, or “relative” returns adjust towards a more normally distributed dataset. In regard to independence of observations I remove repurchase firms from the benchmarks in a rolling

sample: for each 12-month return measurement, any repurchase announcement made in the last 24 months or 12 months forward is excluded from the benchmark. Relative returns and the rolling sample exclusion may provide more reliable results in simple regressions, but there is still a need for more appropriate testing models in regards to the investor's buyback portfolio. Specifically for the BHR model, I can bypass most of the issues inherent in linear regressions with a bootstrap approach.

### 5.3.1 Bootstrap approach

A bootstrap approach is used in Ikenberry et al. (1995) who reference Brock et al. (1992) as their source. In a bootstrap approach, issues regarding standard errors and distributions will also be prevalent in the formation of so-called pseudo-portfolios.

For each *run*, a security is drawn at random for each security in the buyback portfolio. Each randomly drawn security must belong to the same size and valuation quantile as the original announcement firm. Only securities that are available at the beginning of the incumbent year on the NYSE can be matched (mark-assignment rule). Total returns are measured in the same way as before where returns (equally-weighted) for each pseudo-portfolio and size and P/B quantiles are remeasured at every 12-month increment. The only difference is that I omit the rolling sample exclusions of repurchase announcements from both the pseudo-portfolios and buyback portfolios (the buyback portfolios' performance is therefore slightly different from the original method). For each pseudo-portfolio I measure the one-, two-, and three-year average abnormal performance for announcements made between January 1999 and December 2014. A histogram of the three-year abnormal performance for 500 pseudo-portfolios can be seen in figure 5 and all descriptive statistics are available in table 4. I only test *all* announcements in the bootstrap approach, along with the results from only buying securities during recessions and expansionary periods. I choose all announcements because its average return is higher compared to the infrequent and frequent samples, and its sample size is larger.

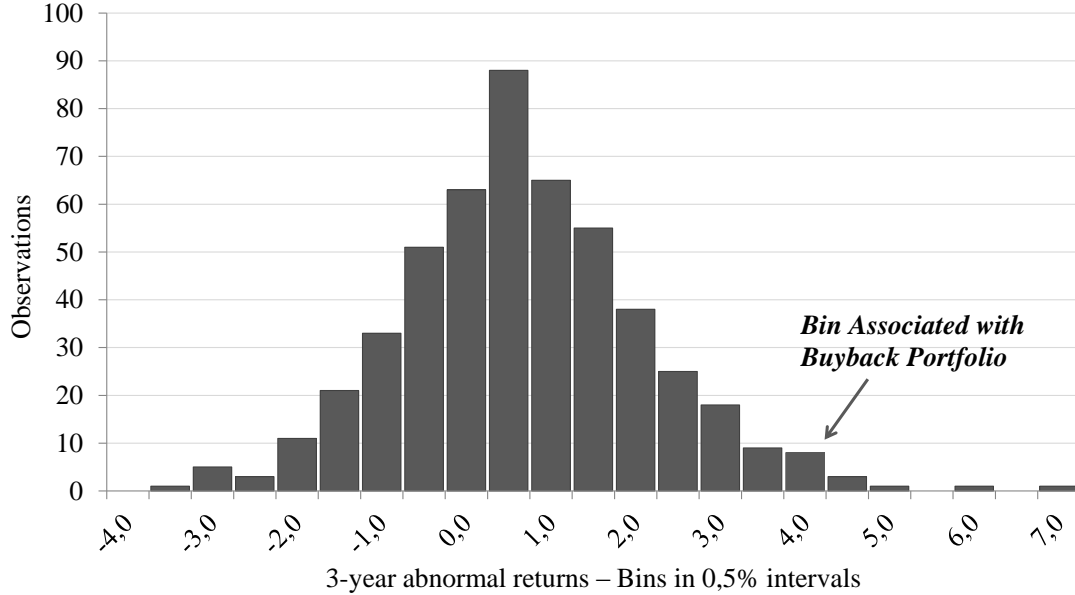
Associated p-values can be measured for the buyback portfolios' abnormal returns, represented by theta,  $\theta$ , in equation 3,

$$p(\theta) = 1 - F(\theta), \quad (3)$$

where  $F(\theta)$  is the cumulative distribution function of theta under the null hypothesis. As can be seen in figure 5, the distribution in returns is rather narrow which is the result of many observations included in the averages. It is also the result of the rather large monthly security samples, where the average selection for each month is 25 buyback firms, a figure large enough to inhibit sizeable deviations from zero. Because I also remeasure returns on an annual basis, within-sample outliers become more tame, and the annual remeasurement

of size and P/B quantiles improves benchmarking which also work against deviations.

**Figure 5: Bootstrap distribution: 500 pseudo-portfolios**  
Compounded three-year abnormal returns, all announcements



Source: Thomson Reuters, author's own calculations

Description: The pseudo-portfolios are created via a bootstrap approach where every repurchase firm is randomly replaced with a firm of the same size and valuation quantile, but also limited to the mark-assignment rule. This process is done for each run and repeated 500 times. Figure 5 display the distribution for the three-year holding period, please see table 4 for further descriptive data.

**Table 4: Descriptive statistics for bootstrap methods, all announcements**

Investment Horizon	Buyback Portfolio	$p(\tau)$	Pseudo-Portfolios		
			Average	Max	Min
1-year Abnormal Returns	1.2%*	0.034	0.0%	2.3%	-2.0%
2-year Abnormal Returns	2.4%*	0.028	0.1%	4.8%	-3.2%
3-year Abnormal Returns	3.6%*	0.026	0.4%	6.5%	-3.7%
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NBER Recessions, 3y ARs	-1.4%	0.684	1.8%	28.9%	-15.3%
> GDP Growth Trend, 3y ARs	4.7%**	0.007	0.4%	5.4%	-4.0%

Sources: Thomson Reuters, author's own calculations

Description:  $p$ -values; \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . The values of NBER Recessions and > GDP Growth Trend simulate the average of an investment strategy buying firms with a repurchase announcement during specific time intervals. Recessions is given by NBER and expansionary periods are above average real GDP growth. The average is measured between 1990 and 2014, quarterly.

### 5.3.2 Fama and French three-factor model

A second method applicable for explaining abnormal portfolio returns is the Fama and French three-factor model, a variant of the CTIME method. In Fama & French (1992), they introduce a new and improved method of measuring risk and expected returns by adding additional explanatory variables to the basic CAPM model. The Fama-French factor model quickly surpassed the CAPM model both in the academic community and by investment professionals alike. In their first factor model Fama and French control for market forces that have been consistent over long periods of time which are: value stocks outperform growth, and small-cap outperforms large-cap. These two market forces along with the market excess return (either value or equally-weighted market return less the risk-free rate) make up the Fama-French *three*-factor model.

Since my sample only consist of securities from the NYSE it would not be transferable to simply download the data from the Kenneth French data library as their factors also include the returns from securities listed on the NASDAQ and AMEX exchanges. Instead I mimic their method with my sample. For each year I download market capitalization and total equity as of December 31st from the preceding year. The sample is divided into small-cap and large-cap by the median firm, and further divided into value stocks (<30th percentile P/B ratios), neutral (percentiles 30 - 70), and growth (>70th percentile). This creates 6 portfolios ranging from small-value to large-growth. Consistent with the mark-assignment rule, only securities available on the NYSE at the beginning of the year are used in the creation of the 6 portfolios.

I measure monthly total returns where the buyback portfolio will resemble an investor buying the companies that had a share repurchase announcement in the preceding month, starting in January 1999. The investor will add securities to his or her portfolio at the end of each month and will hold each security for thirty-six months (the regression starts with returns in January 2000, which gives the investor enough time to build a portfolio with a sufficient number of securities). Returns are equally-weighted and compounded on a monthly basis. A similar approach is used in Ikenberry et al. (1995) and the regression results in table 5 adhere to equation 4,

$$r_{bp,t} - r_{f,t} = \alpha + \beta_m(r_{nyse,t} - r_{f,t}) + \beta_s(r_{small,t} - r_{large,t}) + \beta_{pb}(r_{value,t} - r_{growth,t}) + \epsilon_t, \quad (4)$$

where the buyback portfolios' monthly returns,  $r_{bp}$ , less the risk-free rate,  $r_f$ , are regressed against the market excess return,  $r_{nyse} - r_f$ , the difference between the three small and three large portfolios,  $r_{small} - r_{large}$ , and the difference between the two value portfolios and the two growth portfolios,  $r_{value} - r_{growth}$ . Table 5 shows the results for monthly returns between January 2000 and December 2015 (slightly different dates for occasional announcements due to limited data).



**Table 5: Regression results from adjusted Fama-French three-factor model**  
*Monthly returns January 2000 - December 2015*

Portfolio	Coefficients			
	$\alpha$	Rm - Rf ( $\beta_m$ )	SML ( $\beta_s$ )	VMG ( $\beta_{pb}$ )
All Announcements	0.13 (0.092)	0.91*** (0.000)	-0.25*** (0.000)	0.00 (0.990)
Frequent Announcements	0.12 (0.132)	0.89*** (0.000)	-0.22*** (0.000)	-0.03 (0.512)
Genuine Announcements	0.12 (0.128)	0.91*** (0.000)	-0.18* (0.017)	-0.04 (0.553)
Occasional Announcements (Jan 2002 - Dec 2015)	-0.01 (0.947)	0.98*** (0.000)	-0.29*** (0.000)	-0.05 (0.362)

Sources: Thomson Reuters, Kenneth R. French Data Library for risk-free returns,  $r_f$

Description:  $p$ -values in parentheses; \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ ; Regressed in Stata, robust standard errors, 95% confidence intervals.

The three factor-model shows that the buyback portfolios are highly correlated with the market, as would be expected considering the number of securities included in the buyback portfolios. There is also a significant negative relationship between the buyback portfolios and SML (small minus large) which show that the buyback portfolios underperform when small-cap stocks outperform. This is likely the result of a large-cap overrepresentation among buyback firms. The alpha value is not significant which contradict the pseudo-portfolio estimations, a chasm predicted by Fama (1998) on the discussion of model issues in long-run return studies. Although the significance level decreases, values are quite similar to the BHR portfolios. Three-year monthly compounding of all announcements from the factor model equates to 4.8% ( $1.0013^{36} - 1$ ), which can be compared to the BHR portfolio average return of 4.1%.

#### 5.4 Potential criticism

(i) My paper omits important variables such as employee option programmes and actual shares bought back. Earlier articles found these factors to be informative and significant in the context of abnormal returns. (ii) The factor-model can be criticized on independence issues since the simulation will result in the investor buying the same security multiple times. Frequent announcers will then be overrepresented. (iii) Nowhere do I include transaction costs which will likely remove a considerable chunk from the gross results. Transaction costs will be most prevalent in the factor model. (iv) The inclusion of a value-weighted

BHR model may have helped to bridge the gap between the equal-weighted BHR and CTIME model, thus providing evidence of model issues.

## 6 Conclusions

At face value, there appears to be a minor positive drift by pursuing a buy-and-hold investment strategy based on buying firms announcing a share repurchase programme. But the drift is rather small (even smaller with transaction costs) and its significance model-dependent. However, I find investors are better off pursuing a buy-and-hold investment strategy during expansionary economic periods. Companies pursuing buybacks during recessions are indirectly increasing their leverage which can have knock-on effects, and disposing of cash that could otherwise be used in more productive means such as efficiency investments and bargain-hunting M&A. Earlier literature note that investors should avoid companies undergoing option-funding programmes or simultaneous insider-selling. My contribution help investors assess additional company characteristics in the context of buybacks. First, I caution investors from investing in companies with a considerable cash position. These companies may have limited future prospects and are returning cash to shareholders, instead of pursuing value-enhancing investments. Secondly, I advise from buying CapEx intensive firms. These firms are likely to significantly diminish their investing activities going forward and the repurchase announcement signals this change in capital allocation structure. The lack of confirming traits of undervaluation in conjunction with outperformance during expansionary periods suggest insiders are no better than the market to forecast macroeconomic indicators as a basis for timing stock purchases.

Complementary research in this area would be investor-surveys so we can gain a better understanding of the investor community's interpretation of buybacks and how a repurchase announcement can change an investment case.

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## Appendix

## A Supporting tables

**Table 6: Buyback portfolio abnormal returns & initial cash positions**  
*Average monthly values in %, except observations (sum)*

Year	Obs.	(% ) Cash/Assets		Momentum			
		Buyback	Reference	2y Com.	1y fwd	2y Com.	3y Com.
<b>All Announcements</b>							
1999	733	8.4	5.1	-2.9	-8.7	-4.6	8.4
2000	659	7.4	5.6	3.8	6.2	14.4	20.3
2001	398	9.3	6.9	17.5	1.7	-2.3	-3.4
2002	338	11.7	7.1	31.1	5.2	6.5	0.5
2003	395	12.6	7.8	14.7	4.2	8.1	3.6
2004	503	11.8	8.9	11.0	-1.7	-5.7	-12.4
2005	603	11.0	9.4	1.0	-2.9	-8.0	-18.8
2006	624	11.4	10.7	2.7	-4.6	-11.5	-3.8
2007	727	10.9	8.6	-1.5	-6.7	-1.3	-1.7
2008	499	11.4	8.0	8.5	4.8	4.2	6.6
2009	203	13.8	10.5	14.3	-1.7	-3.7	3.1
2010	432	14.2	9.8	9.5	-1.2	5.5	7.1
2011	509	13.6	10.0	2.8	7.8	11.7	14.5
2012	419	13.8	9.3	10.7	3.6	6.3	20.0
2013	463	12.9	10.2	5.2	2.1	10.6	14.1
2014	603	11.3	10.5	6.0	7.8	6.4	7.4
<b>Sum/avg</b>	<b>8108</b>	<b>11.6</b>	<b>8.7</b>	<b>8.4</b>	<b>1.0</b>	<b>2.3</b>	<b>4.1</b>
<b>Frequent Announcements</b>							
1999	437	8.6	6.4	-2.2	-1.2	4.6	11.5
2000	422	7.1	6.1	-3.0	8.1	19.4	29.8
2001	258	9.0	7.2	14.6	5.5	1.8	-3.0
2002	192	13.2	8.2	36.0	1.5	-7.3	-14.5
2003	222	14.0	9.4	10.8	4.3	10.9	7.0
2004	293	11.9	10.1	9.6	-0.8	-3.2	-10.2
2005	365	11.4	9.9	0.9	-1.4	-8.0	-19.5
2006	431	11.0	9.7	-0.9	-6.0	-14.6	-8.0
2007	500	10.6	9.0	-3.6	-6.8	-1.0	0.6
2008	320	11.3	8.9	9.7	6.8	6.3	5.9
2009	139	14.4	11.3	17.5	-10.3	-13.2	-6.1
2010	226	15.5	11.4	16.6	3.0	6.8	9.1

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Year	Obs.	(% Cash/Assets		Momentum			
		Buyback	Reference	2y Com.	1y fwd	2y Com.	3y Com.
2011	264	14.8	12.0	0.0	7.5	13.1	21.0
2012	275	14.0	10.7	11.1	4.0	8.4	19.6
2013	292	12.8	10.1	8.6	1.5	12.6	13.8
2014	373	10.9	10.5	9.2	9.3	8.1	13.4
<b>Sum/avg</b>	<b>5009</b>	<b>11.9</b>	<b>9.4</b>	<b>8.3</b>	<b>1.4</b>	<b>2.7</b>	<b>4.4</b>

**Genuine Announcements**

1999	137	8.6	5.2	3.0	-10.7	-8.6	5.0
2000	152	8.6	5.6	18.8	0.7	-1.1	-2.5
2001	68	10.4	6.6	30.2	-2.6	-2.8	2.8
2002	110	10.9	6.8	5.5	8.6	26.2	14.9
2003	131	10.8	8.0	17.6	8.4	13.8	16.6
2004	155	12.0	9.1	11.9	-3.0	-9.4	-10.7
2005	188	10.3	9.0	-4.0	-4.9	-5.7	-9.5
2006	153	12.2	10.1	12.1	1.4	5.4	6.7
2007	173	12.1	8.0	1.0	1.4	-0.8	-6.2
2008	121	11.0	7.9	6.6	-1.1	-4.0	-3.9
2009	43	12.0	10.5	2.9	-4.6	-7.6	-4.7
2010	169	13.0	10.8	4.0	-0.7	3.9	2.9
2011	219	11.6	10.4	5.9	5.6	7.3	3.7
2012	126	13.1	9.9	5.3	4.7	7.7	14.7
2013	147	13.1	11.5	0.0	1.5	-1.3	5.1
2014	194	12.0	10.5	1.0	2.1	0.5	-4.4
<b>Sum/avg</b>	<b>2286</b>	<b>11.4</b>	<b>8.7</b>	<b>7.7</b>	<b>0.5</b>	<b>1.6</b>	<b>2.0</b>

**Occasional Announcements**

1999	n\a	n\a	n\a	n\a	n\a	n\a	n\a
2000	n\a	n\a	n\a	n\a	n\a	n\a	n\a
2001	90	13.4	6.7	34.9	-6.9	-9.9	-16.1
2002	76	12.8	8.1	11.1	6.6	24.3	13.8
2003	84	9.2	8.6	15.3	5.3	7.1	10.6
2004	139	12.3	9.5	13.3	-2.7	-5.5	-9.2
2005	163	11.5	9.4	-4.1	-5.2	-4.1	-9.5
2006	132	10.7	9.4	13.2	3.6	13.5	10.8
2007	142	13.5	9.0	-3.6	0.8	-4.8	-9.3
2008	126	10.1	8.7	8.1	2.1	-6.3	-5.9
2009	41	11.5	9.6	-5.4	-10.4	-7.5	-2.8
2010	68	13.4	11.8	-7.1	-3.9	0.7	-10.1
2011	127	11.7	12.0	-5.6	7.3	9.4	4.3

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Year	Obs.	(% ) Cash/Assets		Momentum			
		<i>Buyback</i>	<i>Reference</i>	<i>2y Com.</i>	1y fwd	2y Com.	3y Com.
2012	106	13.4	10.5	5.8	6.8	12.3	15.3
2013	100	12.7	10.9	0.6	3.6	-4.2	-6.3
2014	137	11.8	10.9	2.9	1.9	-3.9	-11.9
<b>Sum/avg</b>	<b>1531</b>	<b>12.0</b>	<b>9.7</b>	<b>5.7</b>	<b>0.8</b>	<b>1.6</b>	<b>-1.9</b>

Source: Thomson Reuters, author's own calculations

Description: Companies belonging to genuine and/or occasional announcements will not have any earlier announcements in the lagging 24 months and 48 months, respectively. Frequent announcements are the byproduct of removing genuine announcements from all announcements. Returns represent average abnormal returns for a given year (the starting points for each run, i.e. investment period). The average cash holdings for the buyback and reference portfolios are also averages at the beginning of each run. The reference portfolios cash holding is constructed by placing identical weights to non-repurchase firms of the same size-valuation mixture as the corresponding buyback portfolios. The reference portfolios cash position is also limited to the mark-assignment rule.