U.PORTO
FEP FACULDADE DE ECONOMIA
UNIVERSIDADE DO PORTO

Share Repurchase Companies Status: Financial Determinants

Rui Filipe Castro da Silva

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Miguel Sousa

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Abstract

Share repurchase are a quite recent phenomenon across finance world. This master's thesis investigates the what could be the potential triggers, determinants, of share repurchase decisions among 538 publicly traded United States of America companies during the period from 2013 to 2020. This study is following the great crisis of 2008. The study examines a comprehensive set of determinants, including firm size, Return on Assets (ROA), ROA volatility, Debt to Equity ratio, lagged stock returns, dividend yield, market book ratio, excess and/or unexpected capital, and low investment opportunities. The primary objective is to understand the factors that influence a company's decision to engage in share repurchases.

The findings of this research reveal several key determinants that significantly impact share repurchase decisions. Firstly, firm size is found to be positively associated with the likelihood of initiating share repurchases. Larger companies are more inclined to repurchase their shares, indicating a preference for returning excess capital to shareholders. Secondly, profitability, as measured by ROA, as well as its volatility, emerges as a critical factor. Higher profitability is positively correlated with share repurchases, suggesting that financially healthier firms are more likely to engage in buybacks. Thirdly, the study highlights the role of excess capital combined with a lack of investment opportunities as a determinant of share repurchases. Companies with surplus capital, coupled with limited investment prospects, are more inclined to repurchase shares as an efficient means of capital deployment. Not so strong results were found when considering the link between the dividend yield and unexpected capital and share repurchases.

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1. Introduction

A fundamental concept of finance is that the ultimate goal of a company is to generate value. To learn about how this value is distributed to investors is of utmost interest, moreover the decision about the method used to distribute to its shareholders: the payment of cash dividends and share repurchases.

Both have several similarities, like signalling the markets, reducing of cash-flow available to investment, minimize agency costs between managers and shareholders, among others. Despite such similarities, there are also several differences, namely that share repurchase reduces the number of outstanding shares, does not decrease the market share price, and is not mandatory for a proportional distribution, among others.

Alongside that, there are several reasons to favour a share repurchase instead of a dividend payment. The company's flexibility regarding the distribution policy remains untouched, as well as reducing share dilution. Also, the possibility of tax benefits. Payments are made to shareholders who desire the payment. Regarding management, increases their power and does not reduce the value of the stock options.

Above, we can find a theoretical description of the pros and cons of share repurchasing and a comparison with dividends payment.

Additionally, in a theoretical sense, the dividend policy may not matter because, in the view of Modigliani & Miller, rational investors are unconcerned with dividends and capital gains. Another viewpoint holds that dividends devalue assets since they are taxed more heavily than capital gains. Finally, dividends have the potential to provide value since they can be used to alter the capital structure and signal the market. But this will always depend on the beliefs, objectives, and circumstances of investors.

That being said, it is interesting to understand the real impacts of share repurchase on the performance of a company, in the recent past and try to discover the pattern for the future and perform a comparison with dividend payments in a practical view.

Regarding the factors that affect share repurchases, this study will attempt to define the relationship between the financial results as EBIT/EBITDA and how it influences the share repurchase decision. There is evidence that earnings per share have an impact on the decision to repurchase shares (Hribars et al., 2006) and to signal the markets (Jain et al., 2009). When deciding to buy back shares, it will be crucial to comprehend the company's current situation and recent returns.

In addition, there is evidence that, regarding Hong Kong enterprises, the performance of the share price is influenced by the company's features (Zhang, 2005).

Thus, this study will analyze due to its impact on financial activity in the World, the share repurchase in the United States of America will , to discover a pattern regarding determinants.

This study intends to continue developing the knowledge about share repurchases and what could trigger these policies, information was gathered from several researchers with the goal of achieving more robust conclusions with several sources.

Also, the period under analysis is post-crisis, a major happening that raised several changes across the financial activity.

After this chapter, Chapter 2 presents the Literature Review, Chapter 3 identifies the Hypotheses under analysis, Chapter 4 describes methodology used in the study and Chapter 5 explains how the data was obtained data as well as a sample description. Chapter 6 presents the results and discussion of the study under each hypothesis, followed by Chapter 7 which enlights for a robustness check of the results under analysis previously. Lastly, chapter 8 concludes the report.

2. Literature review

Despite the wide range of study articles and scholars that have examined this topic, we are unable to unequivocally establish the motivations for dividend payments. This chapter intends to show how difficult such a theme is.

On one side, the findings of Litner (1956) and Gordon (1959) suggested that dividends might increase a company's worth. However, they were contested by Modigliani & Miller (1961), who concluded that dividends are irrelevant. Further, Black (1976) was able to draw the conclusion that dividend policy might be regarded as a "mystery" because of its challenging intricacy and consequences.

In the meantime, several researchers concentrated their research on agency costs and how dividends might affect these. Jensen (1986) limits the funds available for use by managers by concentrating on the dividends provided in the reduction of such costs. Through the run to equity markets to finance such decisions, Easterbrook (1984) ties the payment of dividends with agency costs, resulting in ongoing surveillance. According to Pinkowitz (2006) and Rozeff (1982), dividend payments will reduce agency costs and members' opportunistic behavior.

The dividend signaling theory, which aims to notify the markets about the companies' health and stability (Bhattacharya (1979), Bhattacharya (1980), Miller and Rock (1985), Gurgul et al. (2003), Bozos et al. (2011)), was another viewpoint considered over time.

Additionally, more recently, several researchers followed the path of earnings management and manipulation to achieve the expected dividend levels (Daniel et al. (2007), Skinner & Soltes (2011), Deng et al (2017))

So, as pointed out, dividends assume a very complex role in a company's cycle. More, at the end of the 20th century, and the beginning of the 21st century, dividend payment companies were decreasing (Fama & French (2001), Denis and Osobov (2008), Fatemi and Bildik (2012)). However, Denis and Osobov (2008) and Fatemi and Bildik (2012) state that despite the reduction, well-stable companies continue paying dividends and some more recent and under development will also follow that trail.

As this trend of reducing dividends erupts, new ways of payout are gaining weight across industries. Share repurchases were gaining weight in the US (Skinner (2008) and Haw et al (2011), Skinner and Soltes (2009)) and in Europe (von Eije and Megginson (2008)).

The idea of share repurchases acting as a substitute for dividends emerged more recently, and some studies suggest that reasons that could trigger this substitution are the capital gain tax advantages when compared to income tax (Blouin et al (2007)) or less commitment faced by share repurchases when compared with dividends (Skinner and Soltes (2009).

Modigliani & Miller (1961) stated the irrelevance of dividends, and this is consistent with the perspective of perfect substitutes. Also, Grullon and Michaely (2002), through a market reaction analysis, backed this conclusion, as well as Skinner (2008). However, on the other side, De Angelo et al. (2004) and Dittmar (2000) in the US, and Denis and Osobov (2008) across a sample of countries were not capable of concluding the support of such a hypothesis.

Jiang et al (2013) stated the negative relationship between dividends and repurchase payments. Several, such as Jagannathan et al (2000), Mitchell and Dharmawan (2007) and Andriosopoulos and Hafiz (2013), stated the complementary value of share repurchases to dividends in opposition to the substitute position.

Brav et al (2005) define the share repurchase as residual cash flow. Hillert et all (2016) concluded the increase of liquidity in the market through share repurchase programs. According to Chan et al (2009), there is a hypothesis to choose such an option to mislead investors and possibly boost the share price, even support an overvalued company share price (Liu and Swanson (2016) or even beat analysts' forecast Earnings per Share (EPS) (Hribar et al (2006)). Despite this, Wesson et al. (2018) defied such conclusions of short-term share price impacts in the South African market and concluded that such motivation is not found as a driver for such payout choice. Andriosopoulos and Hafiz (2013) tried to define a pattern regarding the share repurchases follower companies across UK, Germany and France and concluded that largely and widely held companies are more expectable to announce share repurchases. Dewasiri et al (2019) tried to define the determinants of dividend policies in an emerging market as past dividend decisions, investment opportunities or probability. Lee and Suh (2011) concluded that large cash holdings prior to a share repurchase that should be based on the reduction of capital expenditures as if the large cash holdings arise from operation improvement, it should be a more stable and steady growth and could enhance the payment of the dividends.

3. Hypotheses

The objective of this study is to assess which factors could enhance the company to proceed with a share repurchase. Several researchers across times studied which determinants could influence payout policy, through dividends or share repurchases.

The size of a company is often considered a crucial determinant when deciding whether to proceed with a share repurchase. Lee and Suh (2011) stated that share repurchase companies tend to be larger than no-repurchasing ones, and Andriosopoulos and Hoque (2013) found that larger firms with higher market capitalization are more likely to engage in share repurchases, shed light on this relationship. There are also several pieces of evidence from the US market that size influences the companies to undertake a share repurchase (Dittmar, 2000; Grullon & Michaely, 2002; Ikenberry et al., 1995). This finding supports the notion that the size of a company plays a significant role in determining the likelihood of undertaking a share repurchase. Across the payment of the dividend, Denis and Obosov (2008) also concluded the importance of size in companies that undertake such payout policies. However, across dividend-related papers, several find no evidence of size influence in payout decisions, as Al-Naijjar (2011) or to be a negative determinant in Japan, Harada, and Nguyen (2011).

H1: Larger firms are more likely to repurchase.

The most common proxy to understand the influence of size is the log value of total assets, which we will also employ.

The leverage level is expected to also play a role during the decision-making of payout policy, with the purpose of achieving an optimal capital structure, since it should be cheaper to reduce equity than to increase debt, , or due to the flexibility and lower risk of financial distress, for example. Michell and Dharmawan (2007) and Tim Brailsford et al (2008), studied the impact of leverage in open market buybacks in Australia. Lee et al (2010) did not find support for the optimal leverage hypothesis, as well as Andriosopoulos and Hoque (2013) also did not find support for the importance of leverage levels in share repurchases decision.

H2: The greater the debt capacity (more specifically, the lower the debt-equity ratio relative to the industry) more likely is for the company to proceed to a share repurchase.

When we are studying rewarding the shareholders, we must consider the profitability of a company and its volatility. Chay and Suh (2009) concluded the main importance of operating profit volatility when a company's deciding about the payout policy and went further and stated that a company facing more profit volatility will employ the use of shares repurchases as a payout method. Also, Grullon and Michaely (2002) and Denis and Obosov (2008) concluded the importance of profitability when deciding on dividends payment. Dewasiri et al (2019) did not find strong evidence for the importance of profitability in dividends decision.

H3: The less stable and more profitable a company is, the more likely is to proceed to a share repurchase.

We will employ the same two variables used by Lee and Suh (2011) to compute the profitability (ROA – Earnings Before Interest and Taxes/beginning of the year total assets) and to infer the volatility, we will use the ROA volatility, considering the previous 4 years.

There are several views when comparing dividends and share repurchases, due to the flexibility, and tax differences, some researchers concluded the substitution hypothesis and others for the complementary figures. Mainly the substitution hypothesis and the complementary one, Grullon and Michaely (2002) and Andriosopoulos and Hoque (2013). However, the path is not clear Brailsford (2008) did not find strong evidence for the role of past dividends in share repurchase decisions.

H4: The likelihood of a share repurchase is related to the amount of dividends paid.

Like Mitchell and Dharmawan (2007), the three-year average of dividend yield will be used as a proxy of dividends paid.

Undervaluation of the company is also one of the hot topics in this regard. Several researchers stated that companies use share repurchases to signal to the market that their stocks are undervalued due to informational asymmetries. Several types of studies state the importance of undervaluation when proceeding to share repurchases either for positive excess returns following announcements or market-to-book ratio and lagged stock returns, the surveys conducted by Tsetsekos et al. (1991) and Cudd et al. (1996), or the empirical studies by Vermaelen (1984), Comment and Jarrell (1991), Ikenberry et al.(1995), Stephens and Weisbach (1998), Nohel and Tarhan (1998) and Dittmar (2000), Chan (2004), Baker et

al (2003) and Brav et al (2005). Lee (2010) and Brailsford et al (2008) concluded that the undervaluation hypothesis strongness, the first one in the European market and the second in the Australian market.

H5: The likelihood of a share repurchase is negatively related to the company's firm value.

As in Lee and Suh (2011), we will employ the lagged stock returns through the annual stock return during the previous year and the market book ratio. If companies with low MBR and negative stock returns repurchase shares.

The propensity to proceed to a share repurchase, or a shareholder remuneration for any means, will be dependent on the cash that a company holds. Jensen (1986) concluded that the arising agency costs in case of excess capital holdings, for example, could be a reason to trigger the share repurchase decision. As stated by Grullon and Michaely (2002), when a company holds excess or unexpected cash, the flexibility granted to the managers by this remuneration method is something to take in consideration. Dittmar (2000), Mitchell and Dharmawan (2007), Lee and Suh (2011) and Andriosopoulos and Hoque (2013) found support for the excess capital hypothesis, however, Lee et al (2010) did not reach the same results and for the payout of temporary cash-flows Dittmar (2000), Guay and Harford, (2000) Jagannathan et al., (2000) Lee and Rui, (2007).

Also, this excess capital links to the lack of investment opportunities and the option of managers to invest in not-so-profitable projects if they do not distribute the excess cash.

H6: Companies with excess or unexpected capital and low investment opportunities are more likely to proceed to a share repurchase.

As Jagannathan et al. (2000), Dittmar (2000) and Lee and Suh (2011), we will employ the non-operating income as the previous year's other income/previous year-end total assets as a proxy for temporary cash holdings. As a proxy for the excess capital, we will use the ratio of net operating income before taxes and depreciation to total assets at the year-end prior to the repurchase announcement. As a proxy of investment opportunities measure, we will employ the proportion of assets in play, defined as book value relative to the market value of net assets, as in Mitchell and Dharmawan (2007).

4. Methodology

Considering the hypothesis described, the following models will be used for

$$\text{Testing H1: } RR=\alpha+\beta_1 \log(TA) +\varepsilon_i \quad \text{(I)}$$

$$\text{Testing H2: } RR= \alpha + \beta_1 D/E \quad \text{(II)}$$

$$\text{Testing H3: } RR= \alpha + \beta_1 RoA+ \beta_2 RoAVol+\varepsilon \quad \text{(III)}$$

$$\text{Testing H4: } RR= \alpha + \beta_1 DY+\varepsilon_i \quad \text{(IV)}$$

$$\text{Testing H5: } RR= \alpha + \beta_1 LAGST+ \beta_2 MBK+\varepsilon_i \quad \text{(V)}$$

$$\text{Testing H6: } RR= \alpha + \beta_1 NonOper+ \beta_2 RoA+ \beta_3 AIP+\varepsilon_i \quad \text{(VI)}$$

Will consider the above-described models with seasonality and sector influences, using dummies for each year between 2013 and 2020 and for all the industries (25) of the companies.

Thus, each model, will be divided into 4 sub-models. The first sub-model being the simple one, the second to consider the seasonal effects, the third to consider the industry effects and the fourth and last one to test for both effects.

5. Data

The sample and data were gathered from the Orbis database, using the following rules:

- Only companies with more than 1,000 employees were included in the dataset. This criterion helped ensure that the selected companies were of a certain size, indicating their significance in the market.
- Only publicly traded companies in the United States.
- Only active companies were considered, meaning those that were in operation during the data collection period.
- The data collection covered the period between 2013 and 2020. This timeframe allowed for an analysis of changes and trends over several years, providing a comprehensive view of the selected companies' performance.
- Financial Services and Real Estate companies were excluded. This decision was made to maintain consistency within the dataset and avoid potential distortions caused by the specific nature of these industries.

The dataset consisted of 1,986 companies that met the above criteria. This universe of companies formed the basis for the analysis.

Since some pieces of information are not available in the database, all the companies with "n.a." in data fields, referring to non-available, were excluded from the analysis for the year in place. Bearing this in mind, there were 538 companies which conducted at least one share repurchase, during the period under analysis (2013-2020).

According to the hypothesis above, the information collected encompasses the repurchase amount, share price, market capitalization, assets, Return on Assets, dividend Yield, net debt, nonoperating income and net operating income.

Some assumptions were taken when building the variables:

- The repurchase ratio (RR) is the repurchase amount relative to Market Capitalization.
- The debt-to-equity ratio (D/E) was computed as net debt relative to Market Capitalization. However, if the net debt value is negative, the D/E is assumed to be 0.
- Market-to-book ratio (MBK) was computed as Market Capitalization relative to Equity Book Value.
- The ROA is calculated as the net operating income before taxes and depreciation to total assets at the year-end prior to the repurchase announcement (EBITDA/TA.
- The ratio of net operating income before taxes and depreciation to total assets at the year-end prior to the repurchase announcement (NonOper)s was computed through the other non-operating financial income relative to assets.
- As a proxy for the market value of assets, used in the Assets in Place (AIP), was employed the Market capitalization plus the net debt.

6. Results and Discussion

The estimation results of the models explained previously can be found in Table 1. Also below, each hypothesis is segregated, containing a brief description of the results obtained.

a. Hypothesis 1

We observed statistically significant relationships between the logarithm of Total Assets (LOG(TA)) and the Repurchase Ratio in all four models used to analyze the Hypothesis 1. The positive coefficients for LOG(TA) in all models suggest that an increase in Total

Assets corresponds to a higher Repurchase Ratio. This implies that larger firms tend to have a greater propensity for share repurchases. Moreover, the magnitude of the coefficients varied slightly across models, with Model I.IV exhibiting the highest coefficient (0.003314), indicating that the combined effect of seasonal and industry dummies has the most considerable impact on the Repurchase Ratio.

Our analysis of the constant term (C) revealed important insights as well. In Model I.I and Model I.II and Model I.IV, the negative and statistically significant constant coefficients (-0.014152, -0.028124 and -0.030662, respectively) imply that other factors not considered in the models significantly affect the Repurchase Ratio. However, in Model I.III, the constant coefficient (-0.016075) was not statistically significant, indicating that when controlling for industry, the constant term's impact diminishes.

b. Hypothesis 2

When testing for the variable Debt to Equity Ratio, the variable of the hypothesis 2, notably, was observed statistically significant relationships between the Repurchase Ratio in all four models. The significance level of 1% (***), indicating a high degree of confidence in our results, underscores the robustness and reliability of these associations.

The positive coefficients for DE in all models indicate that the variable has a positive impact on the Repurchase Ratio. Specifically, companies with higher DE tend to spend more on share repurchases.

c. Hypothesis 3

In Model III, the variable ROA showed a statistically significant positive relationship with the Repurchase Ratio at the 1% level. This suggests that firms with higher Return on Assets (ROA) tend to have a greater propensity for share repurchases. Similarly, in Model III.II, ROA continued to demonstrate a positive and statistically significant impact on the Repurchase Ratio at the 1% level. The positive coefficient indicates that firms with higher ROA tend to engage in more share repurchases, thereby increasing the Repurchase Ratio. However, in Model III.III, the statistical significance of ROA diminished, and the coefficient lost its significance, holding significance at confidence levels of 10%. This finding suggests that while ROA may impact the Repurchase Ratio when industries are controlled for, the relationship becomes less pronounced.

Table 1 - Multivariate regressions

Model →	I	I.II	I.III	I.IV	II	II.II	II.III	II.IV	III	III.II	III.III	III.IV	IV
Variables↓													
LOG(TA)	0.002531(0.000440)***	0.002647(0.000432)***	0.003225(0.000462)***	0.003314(0.000454)***	-	-	-	-	-	-	-	-	-
DE	-	-	-	-	0.004040(0.001047)***	0.003853(0.001032)***	0.003952(0.001098)***	0.003864(0.001083)***	-	-	-	-	-
ROA	-	-	-	-	-	-	-	-	0.035755(0.010075)***	0.030221(0.009958)***	0.019312(0.010291)*	0.012465(0.010171)	-
ROAVOL	-	-	-	-	-	-	-	-	0.000517(0.000243)**	0.000605(0.000240)**	0.000675(0.000256)***	0.000800(0.000252)***	-
DY	-	-	-	-	-	-	-	-	-	-	-	-	0.000385(0.000378)
LAGST	-	-	-	-	-	-	-	-	-	-	-	-	-
MBK	-	-	-	-	-	-	-	-	-	-	-	-	-
NONOPER	-	-	-	-	-	-	-	-	-	-	-	-	-
AIP	-	-	-	-	-	-	-	-	-	-	-	-	-
C	- 0.014152(0.006882)*	- 0.028124(0.007034)***	- 0.016075(0.010680)	- 0.030662(0.010637)***	0.023997(0.000761)***	0.012263(0.001797)***	0.036061(0.007567)***	0.024299(0.007580)***	0.018570(0.001722)***	0.007774(0.002285)***	0.031254(0.007758)***	0.019920(0.007748)***	0.024692(0.000882)***
Seasonal effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Industry Effects	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	No

This table reports the coefficients and standard deviations observed in each model described in Table 1 analyzed under the ordinary least squares method. The first value refers to the coefficient and inside brackets to standard deviation. Regarding significance level, the code is the following: *** Significant at the 1% level. ** Significant at the 5% level. * Significant at the 10% level. The dependent variable in each regression is the repurchase ratio defined as the share repurchase amount divided by the market capitalization. Regarding independent variables, the log(ta) stands for the logarithm of total assets, DE is the debt-to-equity ratio where net debt is considered the debt and market capitalization the equity, ROA is the return on assets measured by the EBITDA divided by total assets, ROAVOL is the 4-year volatility of the return on assets using the net income, DY represents the 3 year dividend yield, LAGST stands for the lagged stock returns of the previous year, MBK is the market-to-book ratio, NonOper is the non-operating income divided by total assets, AIP represents the Assets in Place being the book-value of assets divided by the market value of assets, this market value of assets was computed using the net debt and market capitalization. The data collected represents the US companies, excluding financial services companies, with more than 1.000 employees in the years that a share repurchase occurred in the years between 2013 and 2020. The next page there is the table 1 continuation.

Continuation Table 1 – Multivariate regressions

Model →	IV.II	IV.III	IV.IV	V	V.II	V.III	V.IV	VI	VI.II	VI.III	VI.IV
Variables↓											
LOG(TA)	-	-	-	-	-	-	-	-	-	-	-
DE	-	-	-	-	-	-	-	-	-	-	-
ROA	-	-	-	-	-	-	-	0.088098(0.010496)***	0.082334(0.010368)***	0.068879(0.01078)***	0.062088(0.010646)***
ROAVOL	-	-	-	-	-	-	-	-	-	-	-
DY	0.000313(0.000465)	0.000282(0.000379)	0.000209(0.000473)	-	-	-	-	-	-	-	-
LAGST	-	-	-	-0.01855(0.002204)***	-0.016298(0.002334)***	-0.019003(0.002177)***	-0.017022(0.002308)***	-	-	-	-
MBK	-	-	-	0.0000035(0.000207)*	0.00000323(0.000000204)*	0.00000226(0.000000203)	0.00000229(0.000002)	-	-	-	-
NONOPER	-	-	-	-	-	-	-	0.041883(0.059409)	0.027375(0.058373)	0.04727(0.060045)	0.032358(0.058958)
AIP	-	-	-	-	-	-	-	0.01325(0.000998)***	0.013167(0.000984)***	0.012378(0.001034)***	0.01234(0.001018)***
C	0.013602(0.001765)***	0.036504(0.007601)***	0.025252(0.007591)***	0.027308(0.000742)***	0.014335(0.001761)***	0.041375(0.007501)***	0.028351(0.00699)***	0.000585(0.002141)	-0.010495(0.002602)***	0.014824(0.007673)**	0.003614(0.007666)
Seasonal effects	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Industry Effects	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes

Interestingly, the variable ROAVOL exhibited intriguing results. In Model III.III and Model III.IV, ROAVOL displayed a statistically significant positive relationship with the Repurchase Ratio at the 1% level. This implies that firms with higher Return on Asset Volatility (ROAVOL) are more likely to engage in share repurchases, resulting in an increased Repurchase Ratio. The coefficients (0.00068 and 0.0008, respectively) indicate the magnitude of the impact. Models III and III.II carry RoAVOL with a 5% significance level.

d. Hypothesis 4

When testing for this hypothesis, the models in place, which include the variable DY, do not demonstrate a statistically significant positive relationship between DY and the repurchase ratio. The coefficient are modest, not achieving strong levels of significance.

e. Hypothesis 5

This Hypothesis gathers 2 variables LAGST and MBK. Model V was used to understand the significance of the hypothesis.

The results from Model V reveal a strong and statistically significant negative relationship between the lagged stock returns (LAGST) and the repurchase ratio. The statistically significant negative coefficient indicates that an increase in the lagged stock returns is associated with a decrease in the repurchase ratio. This finding suggests that past stock performance may influence repurchasing decisions negatively. The same conclusions are observed when we analyze for year and industry fixed effects.

This suggests that both seasonal and industry-specific effects play a role in influencing the relationship between lagged stock returns and the repurchase ratio.

Furthermore, the variable market-to-book ratio (MBK), shows no statistically significant effect on the repurchase ratio across all models. The coefficient remains close to zero, with a standard deviation close to zero as well, indicating no meaningful variability.

f. Hypothesis 6

This Hypothesis encompasses 3 variables, ROA, NONOPER and AIP. Model VI was used to understand the significance of the hypothesis.

These models enlighten the relationship of RoA working as a proxy for the excess capital and the Repurchase Ratio,showing a statistically significant positive relationship with the repurchase ratio across all models.

Regarding the variable Non-operating income (NONOPER), its impact on the repurchase ratio appears less pronounced. Across all models, the coefficients of NONOPER are positive, but they are not statistically significant at conventional significance levels. This suggests that non-operating income, and consequently, unexpected capital, might not have a substantial influence on share repurchases.

Furthermore, the variable Assets in Place (AIP) demonstrates a statistically significant positive relationship with the repurchase ratio across all models. The coefficient of AIP is 0.013 in Model VI and VI.II and 0.012 in Models VI.III and VI.III, indicating that higher assets in place are associated with an increase in the repurchase ratio.

This suggests that companies with better financial performance, as a proxy for excess capital, and more substantial existing assets, acting as a proxy for investment opportunities, are more likely to engage in share repurchases.

7. Robustness Check

To confirm which factors may have a strong impact on the share repurchase decision will be studied all the variables in place in the same regressions. Using the same rationale as above mentioned, there will be a simple Model (Model VII) that consists in a regression with every independent variable (log(TA), D/E, RoA, RoAVOL, DY, LAGST, MBK, NonOper, AIP) under analysis in the previous section, as well as the dependent variable (RR).

Model VII

$$RR=\alpha+\beta_1 \log(TA)+ \beta_2 D/E+ \beta_3 RoA+ \beta_4 RoAVOL+ \beta_5 DivYield+ \beta_6 LAGST+ \beta_7 MBK+ \beta_8 NonOper+ \beta_9 AIP+\varepsilon_i$$

Then, it will be Models VII.II, VII.III and VII.IV, controlling for seasonal effects, industrial effects and both effects side by side, respectively. The results of the variables under analysis are presented in Table 2.

The robustness check reaffirmed the significant relationships between Assets log(TA), Return on Assets (ROA) and Assets in place (AIP) with the repurchase ratio. Furthermore, the presence of consistent and significant coefficients for Return on Asset Volatility (ROAVOL) and lagged stock returns (LAGST) across different models adds further credibility to their potential impact on share repurchase decisions.

Overall, the dissertation provides valuable insights into the factors influencing the repurchase ratio and their significance. The consistent patterns observed across multiple models and the robustness check suggest that Return on Assets and Assets in place play critical roles in driving share repurchases, while other factors, such as non-operating income, might have more nuanced effects.

Contrary to the observed in the previous analysis, overall, the robustness checks (Model VII, VII.II, and VII.IV) consistently demonstrate a significant negative relationship between dividend yield and share repurchases. The finding suggests that higher dividend yields are associated with lower share repurchases.

While the significance levels for DE in the initial models and the robustness checks are generally consistent (significant at either 1% or 5% levels), there is one exception in the robustness check. In Model VII.III, the DE coefficient is not statistically significant (p-value > 0.10), indicating that in this specific model, the relationship between DE and the repurchase ratio is not statistically robust.

Overall, the results from the robustness checks (Model VII and Model VII.II) provide additional support for the positive relationship between DE and the repurchase ratio. However, the significance level of DE varies in the different models, highlighting the importance of considering different model specifications and conducting robustness checks to validate the findings. Additionally, further investigation may be needed to understand the potential reasons for the differences in significance levels across the models.

Table 2 – Robustness Check

Model→	VII	VII.II	VII.III	VII.IV
Variables↓				
LOG(TA)	0.003281(0.000432) ***	0.003521(0.000424) ***	0.003945(0.000454) ***	0.004235(0.000446) ***
DE	0.002034(0.001100) **	0.002839(0.001093) ***	0.001731(0.001133)	0.002513(0.001123) **
ROA	0.096050(0.010816) ***	0.093527(0.010704) ***	0.075665(0.011053) ***	0.071426(0.010932) ***
ROAVOL	0.000370(0.000235) *	0.000499(0.000232) **	0.000535(0.000247) **	0.000699(0.000243) ***
DY	-0.000604(0.000382) *	-0.001749(0.000479) ***	-0.000391(0.000380)	-0.001422(0.000478) ***
LAGST	-0.009687(0.002271) ***	-0.006548(0.002377) ***	-0.011528(0.002250) ***	-0.008749(0.002356) ***
MBK	2.45E-05(1.97E-05)	2.65E-05(1.94E-05)	2.00E-05(1.94E-05)	2.19E-05(1.91E-05)
NONOPER	0.025464(0.058690)	0.008834(0.057613)	0.045841(0.058965)	0.029019(0.057826)
AIP	0.012593(0.001054) ***	0.013461(0.001043) ***	0.011576(0.001081) ***	0.012384(0.001068) ***
C	-0.050806(0.007399) ***	-0.069986(0.007543) ***	-0.049684(0.010938) ***	-0.070320(0.010909) ***
Seasonal effects	No	Yes	No	Yes
Industry Effects	No	No	Yes	Yes

This table reports the coefficients and standard deviations observed in the robustness check, using the model VII, analyzed under the ordinary least squares method. The first value refers to the coefficient and inside brackets to standard deviation. Regarding significance level, the code is the following: *** Significant at the 1% level. ** Significant at the 5% level. * Significant at the 10% level. The dependent variable in each regression is the repurchase ratio defined as the share repurchase amount divided by the market capitalization. Regarding independent variables, the log(ta) stands for the logarithm of total assets, DE is the debt-to-equity ratio where net debt is considered the debt and market capitalization the equity, RoA is the return on assets measured by the EBITDA divided by total assets, RoAVOL is the 4-year volatility of the return on assets using the net income, DY represents the 3 year dividend yield, LAGST stands for the lagged stock returns of the previous year, MBK is the market-to-book ratio, NonOper is the non-operating income divided by total assets, AIP represents the Assets in Place being the book-value of assets divided by the market value of assets, this market value of assets was computed using the net debt and market capitalization. The data collected represents the US companies, excluding financial services companies, with more than 1.000 employees in the years that a share repurchase occurred in the years between 2013 and 2020.

8. Conclusion

The main goal of this study is to help a better understanding of a recent phenomenon like share repurchase. Looking at the US market between 2013 and 2020, it was possible to understand the main determinants of share repurchases.

Most of the results are as expected. Size, excess capital combined with the lack of investment opportunities and profitability enhance the share repurchase decision. Volatility of profitability also plays a favourable role in share repurchases, and this may be linked with the choice to compensate shareholders, avoiding the constraints of dividends payment. On the other side, the good performance of the stocks in the previous year, measured through the Lagged Stock Return reduce the amount spent on share repurchases.

Another conclusion was that as more leveraged a company is, the more engaged is in share repurchases. However, these results showed higher significance in the robustness check than in the individual analysis. A potential path for the following research could be to understand the reasons behind the differences in significance levels related to leverage.

Finally, regarding the dividend yield, the results are not clear and could be a target for future research to try to define the pattern when connected with share repurchases.

9. Appendix

Table 3 – Correlation matrix of the variables under analysis

	TA	DE	ROAVOL	DY	LAGST	MBK	NONOPER	CFTA	AIP
TA	1.0000	0.0527	-0.0396	0.0847	-0.0153	0.0113	0.0990	-0.0643	-0.0072
DE	0.0527	1.0000	-0.0417	0.2655	-0.1967	-0.0363	-0.0004	-0.2162	0.2245
ROAVOL	-0.0396	-0.0417	1.0000	0.0628	-0.0226	-0.0039	0.0329	0.0731	0.0652
DY	0.0847	0.2655	0.0628	1.0000	0.0426	-0.0254	0.0250	-0.0030	0.1439
LAGST	-0.0153	-0.1967	-0.0226	0.0426	1.0000	0.0620	-0.0021	0.0075	-0.2655
MBK	0.0113	-0.0363	-0.0039	-0.0254	0.0620	1.0000	-0.0108	0.1326	-0.0911
NONOPER	0.0990	-0.0004	0.0329	0.0250	-0.0021	-0.0108	1.0000	-0.0979	0.0735
CFTA	-0.0643	-0.2162	0.0731	-0.0030	0.0075	0.1326	-0.0979	1.0000	-0.3603
AIP	-0.0072	0.2245	0.0652	0.1439	-0.2655	-0.0911	0.0735	-0.3603	1.0000

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