
The Determinants of Share Repurchases in Europe

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Abstract

In the last few years, the number of firms engaging in share repurchases has been rising, especially in the US and recently in the biggest European markets. Thus, in this study we intend to identify and explain the main determinants or factors that lead firms to engage in share repurchases in Europe.

This study will focus on France, Germany, and the UK market, with a sample comprised of 163 sample between 2013 and 2019. Moreover, we will use a regression model to look for evidence of the drivers that impact the decision for firms to repurchase shares.

The results reveal that firms repurchase shares to signaling undervaluation and smaller firms are more likely to repurchase shares. Additionally, in some of the sample periods firms repurchase to distribute excess capital and firms with lower total debt total assets repurchase stock to change leverage ratio.

Keywords: Share Repurchases; Share Repurchases Determinants; Excess Capital; Undervaluation; Leverage Ratio

Resumo

Nos últimos anos, tem crescido o número de empresas que recompra as próprias ações, especialmente nos EUA e mais recentemente nos maiores mercados europeus. Sendo assim, neste estudo temos como objetivo identificar e explicar os principais determinantes ou fatores que levam empresas a recomprar as próprias ações na Europa.

Este estudo vai focar-se nos mercados dos seguintes países: França, Alemanha e Reino Unido, com uma amostra composta por 163 empresas entre 2013 e 2019. Por isso, vamos usar um modelo de regressão para procurar evidências de fatores que influenciam na decisão das empresas recomprarem ações.

Os resultados obtidos revelavam que empresas que recompram as próprias ações para sinalizar ao mercado que a empresa está subvalorizada e que pequenas empresas são mais propensas a usarem este mecanismo. Além disso, notamos que em alguns anos do período em estudo, as empresas recompram as próprias ações para distribuir capital que estas têm em excesso e empresas com pouca dívida usam este mecanismo para alterar o rácio de endividamento.

Palavras-Chave: Recompra de Ações; Determinantes de Recompra de Ações; Capital em Excesso; Subvalorização; Rácio de Endividamento

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1. Introduction

In this study we analyse the main determinants of share repurchases in Europe (France, UK, and Germany), which has been common practice in the US and has seen increasing popularity in Europe. There has been an increased number of studies looking to find out why firms engage in share repurchases, such as Dittmar (2000) and more recently, Andriosopoulos and Hoque (2013).

Dittmar (2000) analyses the reasons for firms to repurchase in the US, such as to signal undervaluation to the market, to distribute excess capital, to increase their leverage ratio, as a mechanism of defence from threat of takeovers and to counter dilution effects of stock options. These drivers are also studied by Andriosopoulos and Hoque (2013) on their analysis for Europe (UK, France, and Germany) and (Mitchell & Dharmawan, 2007) for Australia, which find strong evidence of signalling undervaluation, signalling to reduce agency costs and use excess debt capacity, as the main reason for firms to repurchase.

This topic is relevant with the increase of number of firms that repurchase shares and the frequency in which they do so in Europe. Therefore, this study focuses in the most recent years, from 2013 and 2019, to assess if the same determinants that were the reason for firms to engage in share repurchases in the first studies are the same in countries included in this study.

Regarding the methodology and sample, we gathered of 163 announced intentions, completed and rumored share repurchases from France, Germany, and UK, between 2013 and 2019 from the Zephyr database from Bureau van Dijk (BvD) and all the accounting data regarding the total assets, EBITDA, cash and cash equivalents, total equity, market capitalization, total debt was collected on Refinitiv Eikon. The estimation model is the same used by Dittmar (2000) with adjustments, such as, excluding cashflow, return, takeover, and option variables. Therefore, through model, we are going to get estimation of the determinants, and how the statistical significance varies throughout the sample years.

From the obtained results, it was found that firms repurchase shares to signaling undervaluation and smaller firms are more likely to repurchase shares. Additionally, in some of the sample periods firms repurchase to distribute excess capital and firms with lower total debt total assets repurchase stock to change leverage ratio.

This dissertation is organized as follows: in section 2 a literature review of the previous studies on the main determinants of share repurchases over the years. In the section 3 the methodology used is presented with the description of variables. Section 4, it will be presented the sample and its description. For the section 5, there will be a presentation of the results obtained and the respective analysis. And, in the section 6, it there is the conclusions, limitations of this dissertation and suggestions of future researching.

2. Literature Review

In this chapter, we aim to present a literature review of the main theories and studies about the determinants of share repurchases during the last couple of years.

2.1. The main Determinants of Share Repurchases

When a firm has capital more than that required to fund investment opportunities, the management might choose to distribute cash to shareholders, potentially reducing the agency costs related to excess free cash flow (M. C. Jensen, 1986). Firms can distribute cash through share repurchases, which generally increases financial flexibility compared to dividends (Allen, 2003). This flexibility will allow firms to distribute cash flows without commitment on a regular basis like the case of dividends (Dittmar, 2000).

2.1.1. Excess Capital

Firms with high excess capital are more prone to use share repurchases (Dittmar, 2000). This is in line with Stephens and Weisbach (1998) findings, which suggest that there is a positive relationship between the level of cash flow and share repurchases, and Andriosopoulos and Hoque (2013) findings, showing UK firms with low growth engage in repurchases due to excess cash. Moreover, Guay and Harford (2000) argues that shock permanence has an important role for choosing a method of payout. According to their findings, share repurchases come from temporary cash flow shocks.

2.1.2. Agency Costs Incentive and Management Compensation

Share repurchases might be used as signalling to reduce agency costs (Mitchell & Dharma-
wan, 2007). Jagannathan and Stephens (2003) find that firms with lower managerial owner-
ship repurchase more frequently. This is in line with Andriosopoulos and Hoque (2013) ev-
idence that large and widely dispersed firms in France, Germany and UK are more likely to
engage in share repurchases. Additionally, Michael C. Jensen and Meckling (1976) suggest
that when the advantages of reducing agency costs are higher than the costs of repurchase,
it is better to repurchase to reduce ownership dispersion. They add that firms with low insider

ownership concentration and high agency costs, are more likely to engage in share repurchases.

Fenn and Liang (2001) find a positive relationship between share repurchases and management stock options. Their evidence suggests growth in stock options helps explain rise in share repurchases. Moreover, according to Dittmar (2000), firms repurchase to avoid dilution effects of stock options. This will allow the management to give cash to shareholders without diluting the per-share value of the stock, which might be important for the firm, because the stock price is preserved.

2.1.3. Optimal Leverage ratio

Firms use share repurchases as a method to change debt-equity ratio, by issuing debt and reducing equity (Bagwell and Shove, 1988). This is in line with the hypothesis tested by Hovakimian, Opler, and Titman (2001) that firms tend to get to target debt ratios when they engage in share repurchases. They also found that profitable firms are likely to issue debt instead of equity and to repurchase shares rather than reduce debt. Moreover, according to Jagannathan and Stephens (2003) firms with lower levels of debt are those that repurchase with more frequency. Therefore, If the leverage ratio of a firm is below its target, it's likely that the firm repurchases shares, using excess debt capacity that the firm might have (Mitchell & Dharmawan, 2007). Thus, a capital structure has influence on the company decision to repurchase (Dittmar, 2000).

2.1.4. Signalling of Undervaluation

According to Ikenberry, Lakonishok, and Vermaelen (1995) undervaluation is one of most important reasons firms engage in share repurchases. By repurchasing, the firm's management is sending a signal to the market that the stock might be undervalued. Then, it is expected to see the markets respond efficiently, thus making the new price reflect the true value of the information the managers conveyed. They also found that undervaluation results from information asymmetry. This is consistent with Jagannathan and Stephens (2003) that find undervaluation the reason infrequent repurchase occurs in firms with high levels of asymmetric information and Dittmar (2000) that finds that misevaluation of a firm results from

information asymmetry. Andriosopoulos and Hoque (2013) report evidence of undervaluation as a cause of repurchases in France and Germany. Moreover, Vermaelen (1981) shows that smaller firms engage in share repurchases as result of undervaluation, contrary to Ikenberry et al. (1995), who observe that large firms are more likely to repurchase due to undervaluation¹.

2.1.5. Taxation Incentive

Evidence provided by Grullon and Michaely (2002) and Dittmar (2000) from the US, shows that Share repurchases have been the preferred mechanism, because of the relative advantage of capital gains over dividend income. But an increase in capital gains tax rate might reduce the relative benefit obtained from engaging in share repurchases. Nevertheless, Grullon and Michaely (2002) observe that even with a reduced tax benefit of capital gains from the Tax Reform Act (TRA) ² as of 1986, the marginal rate on capital gains was lower than the marginal rate on dividend income and there is also the possibility that investors might postpone when to realize capital gains and to pay taxes. In this way, repurchases are more efficient for shareholders.

Grullon and Michaely (2002) and Skinner (2008) find evidence that firms use share repurchases as substitutes of dividends, resulting from tax gains differential between these two mechanisms. Contrary to this, DeAngelo, DeAngelo, and Skinner (2000) and Dittmar (2000) show that share repurchases do not replace dividends. On the other hand, Jagannathan, Stephens, and Weisbach (2000) observes that dividends come from more stable cash flows and share repurchases from temporary cash flows. Thus, they find that share repurchases are complementary, rather than substitutes to dividends. This is consistent with Jain, Shekhar, and Torbey (2009) results showing that these methods are used by different types of firms in distinct circumstances and Andriosopoulos and Hoque (2013) findings.

¹ They examined the long-run performance after open market share repurchase announcements between 1980-1990. They found that the average abnormal four-year buy-and-old return following announcement was 12.1% and for value stocks, the average abnormal return was 45.3%.

²They showed that by the end of 2001, the top marginal rate on long-term capital gains was 20%, but the top marginal rate on dividend income was 39.6%.

2.1.6. Takeover Deterrence

Firms might also engage in repurchases to block takeover attempts (Dittmar, 2000). Bagwell (1991) shows that with repurchases the cost to buy the target firm increases, because of the existence of an upward-sloping supply curve of shares, therefore cutting out those shareholders with the lowest reservations value. He also argues that this is more likely when there is a large heterogeneity of shareholders and private benefits of control are small.

3. Methodology

In this chapter, it is presented the methodology used in this dissertation. To determine the main drivers of firms engaging in share repurchases during the sample period we used a regression model, inspired by the model used in Dittmar (2000). Nevertheless, we adjusted the model, excluding cashflow, return, takeover, and option variables, leaving only those we found to be relevant for the analysis.

$$REP = \alpha + \beta_1 CASH + \beta_2 MKBK + \beta_3 SIZE + \beta_4 LEVER + \beta_5 PAYOUT + u$$

3.1. The Model

The explanatory variables in our model are the following:

Table 1 - Summary of the key variables

Variables	Formulas
CASH	Cash and Equivalents / Total Assets
MKBK	Market Capitalization / Total Equity
SIZE	Natural Logarithm of Total Assets
LEVER	Total Debt / Total Assets
PAYOUT	Dividend per Share / Price per Share

3.1.1. Dependent Variable

The dependent variable will be defined as REP, which is the volume of share repurchase divided by previous year's end market value of equity (Dittmar, 2000).

3.1.2. Independent Variables

As with Dittmar (2000), we have as a proxy of Cash, the ratio of cash and equivalents to total assets of the year-end prior to the repurchase announcement. As a result, it is expected to be a positive relationship between CASH and the decision to repurchase shares.

To measure undervaluation, we use Market-to-book ratio (MKBK) as in Andriosopoulos and Hoque (2013); Dittmar (2000); Ikenberry et al. (1995). This measure assumes that firms' low market-to-book ratios earn abnormal returns after repurchasing, because of undervaluation. Therefore, firms with low MKBK have higher probability to engage in share repurchases.

It is assumed that firms repurchase shares when the leverage ratios are below their target or optimal level and there is a negative relationship between the level of debt and the decision to repurchase. We included a ratio of total debt to total assets (Andriosopoulos & Hoque, 2013; Dittmar, 2000; Grullon & Michael, 2002) to measure the variable LEVER.

To measure the impact that the SIZE of a firm can have to repurchase, we used as proxy the natural logarithm of the total value of a firm's total assets as in Dittmar (2000)³. As a proxy for PAYOUT we employed the dividend yield ratio, in line with Andriosopoulos and Hoque (2013)⁴.

³ Alternatively, total assets can be used to measure SIZE as in Andriosopoulos and Hoque (2013) and natural logarithm of the total value of firm's market capitalization

⁴ Dittmar (2000) to control for the payment of dividends uses dividends per net income ratio (DIV/NI).

4. Sample

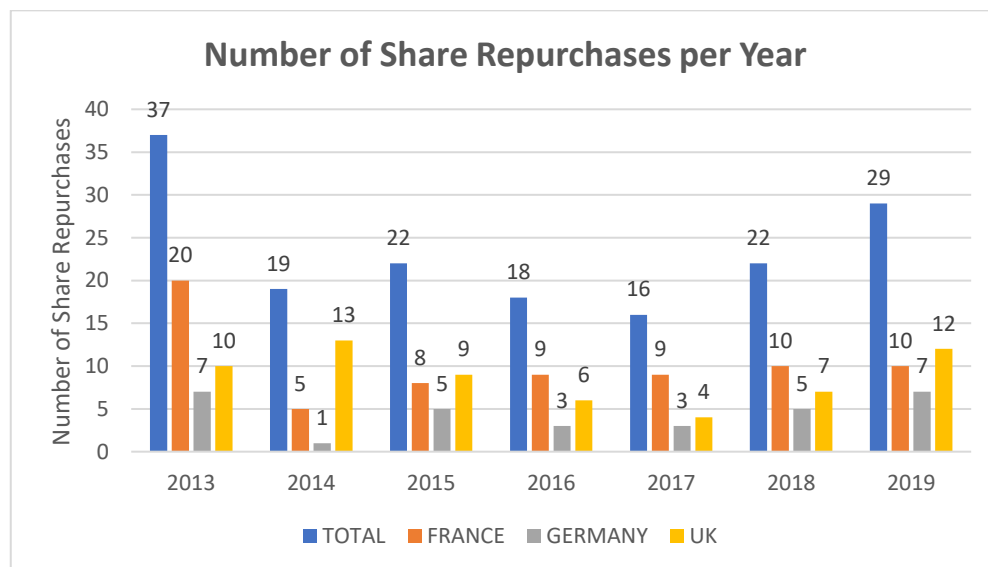
For this study, the sample was obtained from the Zephyr database from Bureau van Dijk (BvD) and from Refinitiv Eikon, and it consists of all open-market share repurchases announced, completed and rumored within the period of 2013 to 2019 from France, Germany, and UK. Furthermore, we excluded from the sample all financial institutions, property companies and investment trusts. The reason of the exclusion is to be consistent with the practice used in the literature (e.g., Andriosopoulos & Hoque, 2013; Dittmar, 2000).

The sample contains a total of 163 announced intentions, completed and rumored share repurchases of firms from France (71), United Kingdom (61) and Germany (31). All the accounting data regarding the total assets, EBITDA, cash and cash equivalents, total equity, market capitalization and total debt was collected on Refinitiv Eikon. Additionally, firms' price per share information was collected from Zephyr database from Bureau van Dijk (BvD) and Refinitiv Eikon and annual dividend per share.

4.1. Evolution of Share Repurchases from 2013 to 2019

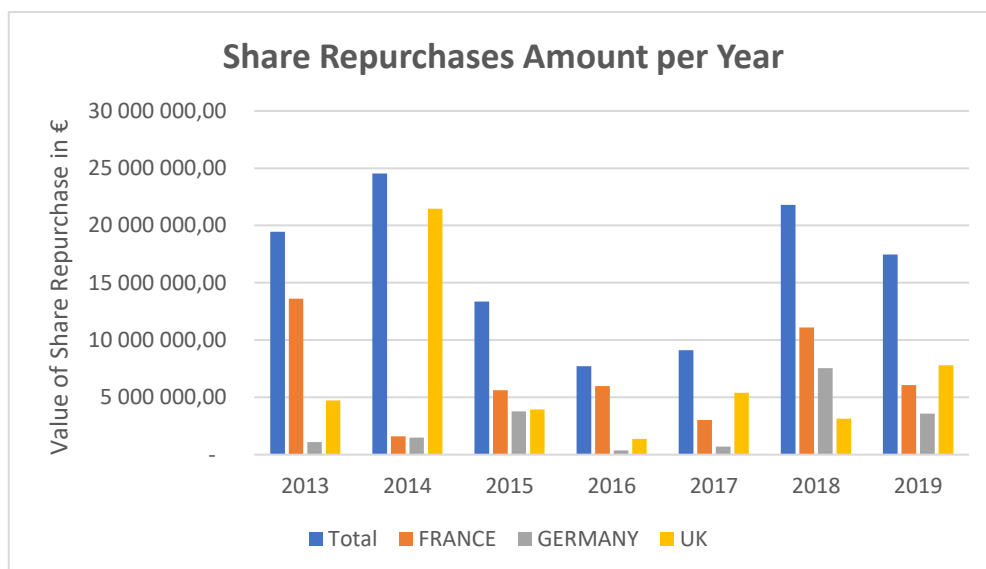
As is shown on the figure 1, 2013 was the year with more shares repurchases from the collected sample, a total of 37 repurchases for the three countries analysed. In the next four years we see a sharp decline in the total number of shares repurchases, and then there is a steady rise from 2018 to 2019.

Figure 1 - Evolution of Number of Share Repurchases per year



In the figure 2, the tendency is different from the figure 1. Contrary to what is shown in the figure 1, with the highest number of shares repurchases being in 2013, in the same year the value of repurchases is lower compared to 2014 and from 2017 to 2019 the value of repurchases slightly decreases.

Figure 2 - Evolution of the Value of Share Repurchases per year



5. Results

The main goal of this analysis is to measure the determinants that impact the decisions of firms to engage in share repurchases. To perform this analysis, we used a multivariate OLS regression model.

Furthermore, some assumptions of the OLS method were considered. Regarding the homoscedasticity of the regression, it was not valid, therefore we have included an estimator for heteroscedasticity, so that we could correct the variances and covariances of the estimators and the t-statistic.

First, regarding CASH it is possible to see that in 2015, 2018 and 2019, the sign is positive. This means that the greater the amount of cash firms have, the higher the likelihood for these firms to repurchase its own shares. This is in line with results found by Dittmar (2000), which suggest that there is a positive relationship between the level of cash and share repurchases. But for 2013, 2014, 2016 and 2017 the results were different from what was expected, the sign was negative, which means that a high a lot of cash available might not affect the decision for a firm to engage in share repurchases. The result for 2015 was statistically significant at 1% level. For 2013 and 2016 the results were statistically significant at 5% and 2018 and 2019, the results were statistically significant at 10%.

Concerning the variable MKBK, for most of the sample years (2013, 2014, 2015, 2016, 2017 and 2019), it has a negative sign, in line with Dittmar (2000) findings. Therefore, as it was expected undervaluation is one of the reasons firms do repurchases (Ikenberry, Lakonishok, and Vermaelen, 1995; Andriosopoulos and Hoque, 2013; Mitchell & Dharmawan, 2007)). For 2013 and 2014 the results were statistically significant at 1% and 10% level, respectively. Additionally, as it can be seen in the analysis of the SIZE variable, there is the negative sign for all the sample years. This means that smaller firms were more likely to repurchase shares, contrary to Dittmar (2000) findings. These results are statistically significant for 2013, 2016 and 2019 at 1% level and for 2014 at 10% level.

Moreover, if it is considered that information availability and firm's size are positively correlated, then small firms are more likely to be misvalued and therefore repurchase its shares as

result of undervaluation (Vermaelen, 1981). These results were different from Ikenberry et al. (1995) results, which show large firms were more likely to repurchase due to undervaluation.

Table 2 - OLS estimation results (2013-2019). The symbols *, ** and * denote statistical significance at the 1%, 5% and 10% level, respectively.**

Year	2013	2014	2015	2016	2017	2018	2019
CASH	-0,288**	-0,161	0,389* **	-0,169**	-0,028	0,233*	0,194*
MKBK	-0,021***	-0,042*	-0,008	-0,006	-0,010	0,001	-0,007
SIZE	-0,021***	-0,018*	-0,003	-0,014***	-0,009	-0,009	-0,028***
LEVER	-0,125	0,765*	0,043	-0,027	-0,311*	0,070	0,281**
PAYOUT	0,631	-0,578	0,919	0,290	0,484	-0,048***	-0,424
Number of Observations	37	19	22	18	16	22	29
R-squared	0,414	0,587	0,589	0,512	0,431	0,410	0,585
Adjusted R-squared	0,321	0,428	0,452	0,309	0,146	0,226	0,495
F-statistics	4,398**	3,691*	4,304*	2,517***	1,513*	2,226***	6,488***

The variable LEVER has a negative sign for some of the sample years, respectively 2013, 2016 and 2017. This means that it is more likely for a firm with a lower level of total debt compared to total assets, to repurchase its own shares. This in line with Jagannathan and Stephens (2003) and (Mitchell & Dharmawan, 2007) that defends firms with lower levels of debt are those that repurchase with more frequency and Dittmar (2000) findings, which shows that if the leverage ratio of a firm is below its target, it's likely that the firm repurchases shares, thus a capital structure has influence on the company decision to repurchase. In 2017, the result was statistically significant at 10% level. Nevertheless, for 2014, 2015 and 2018 the results have a positive sign, which is different to what was expected.

Lastly, regarding the analysis of the PAYOUT variable, the results for 2014, 2018 and 2019 have a negative sign, which means that it is more likely for a firm with a lower level of

dividend to repurchase. These results are consistent with evidence provided by Grullon and Michaely (2002) and Dittmar (2000) from the US, that shows share repurchases have been the preferred mechanism, because of the relative advantage of capital gains over dividend income and are used as substitutes of dividends (Skinner, 2008). In 2018, the result was statistically significant at 1% level. Contrary to this, in 2013, 2015, 2016 and 2017, the sign of the results was positive, meaning that with an increase in dividends, it is likely for a firm to repurchase its own shares. This is in line with Jagannathan, Stephens, and Weisbach (2000) findings, that shares repurchase are complementary, rather than substitutes to dividends.

Moreover, it can be seen that for all the sample years the overall results were statistically significant, which means at least one independent is relevant. In 2013, 2017 and 2018 present a lower r-squared, which means in this model explain a smaller proportion of variance in dependent variable. For other years 2014, 2015, 2016 and 2019, r-squared is 0.587, 0.589, 0.512 and 0.585 respectively, therefore at least a proportion of 51.2% of variance in the dependent variable is explained by the model.

6. Conclusion

With the increase of share repurchases in the last years worldwide, it became important to assess the main determinants of Share Repurchases in Europe (France, Germany, and UK) from 2013 to 2019.

A sample of 163 announced intentions, completed and rumored share repurchases from France, Germany, and UK, between 2013 and 2019, was obtained from The Zephyr database from Bureau van Dijk (BvD) and all the accounting data regarding the total assets, EBITDA, cash and cash equivalents, total equity, market capitalization, total debt was collected on Refinitiv Eikon. With this data we were able to test a regression model, to estimate the variables.

According to the literature, the decision to repurchase shares is mainly driven by excess capital, agency costs incentive and management compensation, optimal leverage ratio, undervaluation, taxation, and takeover deterrence. In this study, through a regression model we assessed if some of determinants (excess capital, undervaluation, optimal leverage ratio and taxation) affect the decision to repurchase.

It was found that throughout 2013 and 2019, firms repurchase shares to signaling undervaluation and smaller firms are more likely to repurchase shares. Moreover, in some of the sample periods firms repurchase to distribute excess capital and firms with lower total debt total assets repurchase stock to change leverage ratio.

Nevertheless, there was some limitations, because the study could not assess how agency costs incentive, management compensation and takeover defense drive. It was not possible to gather data to do so. Additionally, the sample size is relatively low compared other previous studies, to better measure the determinants of share repurchases and data collected is not from all European countries, which might not provide a fully understanding of this topic. Thus, this dissertation can't fully support previous studies that analyze the main reasons for firms to repurchase their own shares.

Therefore, we support and encourage future studies on this topic, to have clear evidence of all the drivers of share repurchase in these countries, as there are still gaps in this topic.

7. References

- Allen, F. (2003). Corporate Finance Payout Policy. *Handbook of the economics of finance*, 1, 337-429. doi:10.1016/S1574-0102(03)01011-2
- Andriosopoulos, D., & Hoque, H. (2013). The determinants of share repurchases in Europe. *International Review of Financial Analysis*, 27, 65-76. doi:10.1016/j.irfa.2012.12.003
- Bagwell, L. S. (1991). Share Repurchase and Takeover Deterrence. *The RAND Journal of Economics*, 22(1), 72-88. doi:10.2307/2601008
- DeAngelo, H., DeAngelo, L., & Skinner, D. J. (2000). Special dividends and the evolution of dividend signaling. *Journal of Financial Economics*, 57(3), 309-354. doi:[https://doi.org/10.1016/S0304-405X\(00\)00060-X](https://doi.org/10.1016/S0304-405X(00)00060-X)
- Dittmar, A. K. (2000). Why do firms repurchase stock? *Journal of Business*, 73(3), 331-355. doi:Doi 10.1086/209646
- Fenn, G. W., & Liang, N. (2001). Corporate payout policy and managerial stock incentives. *Journal of Financial Economics*, 60(1), 45-72. doi:[https://doi.org/10.1016/S0304-405X\(01\)00039-3](https://doi.org/10.1016/S0304-405X(01)00039-3)
- Grullon, G., & Michaely, R. (2002). Dividends, Share Repurchases, and the Substitution Hypothesis. *The Journal of Finance*, 57(4), 1649-1684. doi:<https://doi.org/10.1111/1540-6261.00474>
- Guay, W., & Harford, J. (2000). The cash-flow permanence and information content of dividend increases versus repurchases. *Journal of Financial Economics*, 57(3), 385-415. doi:[https://doi.org/10.1016/S0304-405X\(00\)00062-3](https://doi.org/10.1016/S0304-405X(00)00062-3)
- Hovakimian, A., Opler, T., & Titman, S. (2001). The Debt-Equity Choice. *The Journal of Financial and Quantitative Analysis*, 36(1), 1-24. doi:10.2307/2676195
- Ikenberry, D., Lakonishok, J., & Vermaelen, T. (1995). Market underreaction to open market share repurchases. *Journal of Financial Economics*, 39(2), 181-208. doi:[https://doi.org/10.1016/0304-405X\(95\)00826-Z](https://doi.org/10.1016/0304-405X(95)00826-Z)
- Jagannathan, M., & Stephens, C. (2003). Motives for Multiple Open-Market Repurchase Programs. *Financial Management*, 32(2), 71-91. doi:10.2307/3666337
- Jagannathan, M., Stephens, C. P., & Weisbach, M. S. (2000). Financial flexibility and the choice between dividends and stock repurchases. *Journal of Financial Economics*, 57(3), 355-384. doi:[https://doi.org/10.1016/S0304-405X\(00\)00061-1](https://doi.org/10.1016/S0304-405X(00)00061-1)

- Jain, B. A., Shekhar, C., & Torbey, V. (2009). Payout initiation by IPO firms: The choice between dividends and share repurchases. *The Quarterly Review of Economics and Finance*, 49(4), 1275-1297. doi:<https://doi.org/10.1016/j.qref.2009.09.003>
- Jensen, M. C. (1986). Agency Costs of Free Cash Flow, Corporate-Finance, and Takeovers. *American Economic Review*, 76(2), 323-329. Retrieved from <Go to ISI>:/WOS:A1986C125500066
- Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305-360. doi:[https://doi.org/10.1016/0304-405X\(76\)90026-X](https://doi.org/10.1016/0304-405X(76)90026-X)
- Mitchell, J. D., & Dharmawan, G. V. (2007). Incentives for on-market buy-backs: Evidence from a transparent buy-back regime. *Journal of Corporate Finance*, 13(1), 146-169. doi:<https://doi.org/10.1016/j.jcorpfin.2006.12.002>
- Skinner, D. J. (2008). The evolving relation between earnings, dividends, and stock repurchases. *Journal of Financial Economics*, 87(3), 582-609. doi:<https://doi.org/10.1016/j.jfineco.2007.05.003>
- Stephens, C. P., & Weisbach, M. S. (1998). Actual Share Repurchases in Open-Market Repurchase Programs. *The Journal of Finance*, 53(1), 313-333. doi:<https://doi.org/10.1111/0022-1082.115194>
- Vermaelen, T. (1981). Common stock repurchases and market signalling: An empirical study. *Journal of Financial Economics*, 9(2), 139-183. doi:[https://doi.org/10.1016/0304-405X\(81\)90011-8](https://doi.org/10.1016/0304-405X(81)90011-8)

8. Annex

8.1. Annex I – Data Characteristics

Table 3 - Variables Descriptive Statistics (2013)

	Mean	Median	maximum	Minimum	Std. Dev.	Observations
CASH	0,103	0,075	0,428	0,013	0,090	37
MKBK	2,081	1,733	5,315	0,611	1,196	37
SIZE	14,94	14,94	17,93	12,13	1,600	37
LEVER	0,167	0,148	0,404	0,006	0,111	37
PAYOUT	0,024	0,023	0,063	0,000	0,015	37

Table 4 - Variables Descriptive Statistics (2014)

	Mean	Median	maximum	Minimum	Std. Dev.	Observations
CASH	0,087	0,077	0,239	0,013	0,063	19
MKBK	2,369	1,689	6,348	0,755	1,555	19
SIZE	16,24	16,25	19,38	12,68	1,634	19
LEVER	0,176	0,158	0,435	0,027	0,100	19
PAYOUT	0,027	0,024	0,059	0,000	0,015	19

Table 5 - Variables Descriptive Statistics (2015)

	Mean	Median	maximum	Minimum	Std. Dev.	Observations
CASH	0,158	0,143	0,769	0,006	0,169	22
MKBK	1,982	1,651	6,211	0,000	1,411	22
SIZE	15,15	15,81	18,47	10,45	2,391	22
LEVER	0,232	0,179	1,228	0,000	0,282	22
PAYOUT	0,022	0,022	0,055	0,000	0,015	22

Table 6 - Variables Descriptive Statistics (2016)

	Mean	Median	maximum	Minimum	Std. Dev.	Observations
CASH	0,079	0,062	0,284	0,017	0,063	18
MKBK	1,981	1,727	4,690	0,715	0,996	18
SIZE	16,07	16,35	18,44	12,79	1,479	18
LEVER	0,180	0,152	0,563	0,019	0,129	18
PAYOUT	0,027	0,025	0,062	0,011	0,012	18

Table 7 - Variables Descriptive Statistics (2017)

	Mean	Median	maximum	Minimum	Std. Dev.	Observations
CASH	0,090	0,058	0,257	0,021	0,070	16
MKBK	1,930	1,793	3,156	0,758	0,727	16
SIZE	16,356	16,46	18,95	13,23	1,523	16
LEVER	0,183	0,201	0,344	0,026	0,087	16
PAYOUT	0,030	0,025	0,086	0,010	0,020	16

Table 8 - Variables Descriptive Statistics (2018)

	Mean	Median	maximum	Minimum	Std. Dev.	Observations
CASH	0,111	0,081	0,359	0,013	0,104	22
MKBK	2,343	2,135	5,649	0,308	1,322	22
SIZE	15,77	15,73	18,73	12,60	1,519	22
LEVER	0,177	0,197	0,361	0,001	0,111	22
PAYOUT	0,162	0,020	2,387	0,000	0,509	22

Table 9 - Variables Descriptive Statistics (2019)

	Mean	Median	maximum	Minimum	Std. Dev.	Observations
CASH	0,080	0,060	0,263	0,007	0,071	29
MKBK	1,811	1,639	3,685	0,639	0,859	29
SIZE	16,68	16,95	18,78	11,93	1,459	29
LEVER	0,288	0,316	0,428	0,091	0,085	29
PAYOUT	0,033	0,027	0,092	0,000	0,024	29

Table 10 - Variables Correlation Matrix (2013)

	CASH	MKBK	SIZE	LEVER	PAYOUT
CASH	1,000	-	-	-	-
MKBK	-0,143	1,000	-	-	-
SIZE	-0,430	0,334	1,000	-	-
LEVER	-0,395	0,068	0,112	1,000	-
PAYOUT	-0,147	0,087	0,204	0,172	1,000

Table 11 - Variables Correlation Matrix (2014)

	CASH	MKBK	SIZE	LEVER	PAYOUT
CASH	1,000	-	-	-	-
MKBK	-0,122	1,000	-	-	-
SIZE	-0,481	0,184	1,000	-	-
LEVER	-0,275	0,632	-0,034	1,000	-
PAYOUT	-0,401	-0,053	0,497	0,278	1,000

Table 12 - Variables Correlation Matrix (2015)

	CASH	MKBK	SIZE	LEVER	PAYOUT
CASH	1,000	-	-	-	-
MKBK	-0,075	1,000	-	-	-
SIZE	-0,606	0,182	1,000	-	-
LEVER	-0,288	0,112	0,179	1,000	-
PAYOUT	-0,471	0,107	0,727	0,128	1,000

Table 13 - Variables Correlation Matrix (2016)

	CASH	MKBK	SIZE	LEVER	PAYOUT
CASH	1,000	-	-	-	-
MKBK	0,098	1,000	-	-	-
SIZE	-0,063	0,185	1,000	-	-
LEVER	-0,154	-0,232	0,248	1,000	-
PAYOUT	0,192	-0,274	0,263	-0,024	1,000

Table 14 - Variables Correlation Matrix (2017)

	CASH	MKBK	SIZE	LEVER	PAYOUT
CASH	1,000	-	-	-	-
MKBK	-0,278	1,000	-	-	-
SIZE	-0,463	-0,189	1,000	-	-
LEVER	-0,457	-0,126	0,583	1,000	-
PAYOUT	-0,280	-0,389	0,505	0,542	1,000

Table 15 - Variables Correlation Matrix (2018)

	CASH	MKBK	SIZE	LEVER	PAYOUT
CASH	1,000	-	-	-	-
MKBK	0,150	1,000	-	-	-
SIZE	-0,501	0,101	1,000	-	-
LEVER	-0,170	0,049	0,019	1,000	-
PAYOUT	0,485	0,133	-0,145	-0,360	1,000

Table 16 - Variables Correlation Matrix (2019)

	CASH	MKBK	SIZE	LEVER	PAYOUT
CASH	1,000	-	-	-	-
MKBK	-0,152	1,000	-	-	-
SIZE	-0,321	-0,198	1,000	-	-
LEVER	-0,219	0,174	0,138	1,000	-
PAYOUT	-0,012	-0,134	0,418	0,346	1,000

8.2. Annex II – List of firms that repurchased stock.

Table 17 - List of firms that repurchased stock (2013-2019)

FIRMS	
SOFTWARE AG	VIVENDI SA
FRESENIUS MEDICAL CARE AG & CO. KGAA	LAGARDERE SCA
3U HOLDING AG	NEURONES SA
DRAGERWERK AG & CO. KGAA	SCHNEIDER ELECTRIC SE
MOBOTIX AG	PIXIUM VISION SA
INFINEON TECHNOLOGIES AG	EIFFAGE SA
FUCHS PETROLUB SE	SEVERN TRENT PLC
L'OREAL SA	EXPERIAN PLC
PUBLICIS GROUPE SA	HOWDEN JOINERY GROUP PLC
VINCI SA	BOOHOO.COM PLC
IPSEN SA	MARKS & SPENCER GROUP PLC
CAP GEMINI SA	BUSHVELD MINERALS LTD
STEF SA	RIO TINTO PLC
MERSEN SA	EVONIK INDUSTRIES AG
ASSYSTEM SA	CEWE STIFTUNG & CO. KGAA
LEGRAND SA	COMPAGNIE DE SAINT-GOBAIN SA
BIOMERIEUX SA	SANOFI SA
LAURENT-PERRIER SA	LVMH MOET HENNESSY - LOUIS VUITTON SE
KERING SA	SAFRAN SA
SOMFY SA	IPSOS SA
SOCIETE BIC SA	DERICHEBOURG SA
INTERPARFUMS SA	BURBERRY GROUP PLC
AXWAY SOFTWARE SA	REDROW PLC
CHRISTIAN DIOR SA	SSE PLC
ATOS SE	GEA GROUP AG
TONNELLERIE FRANCOIS FRERES SA	BILFINGER SE
REMY COINTREAU SA	NEXANS SA
RECKITT BENCKISER GROUP PLC	CAPGEMINI SE
BAE SYSTEMS PLC	BT GROUP PLC
BRITISH AMERICAN TOBACCO PLC	PEARSON PLC
IMI PLC	VODAFONE GROUP PLC
SMITH & NEPHEW PLC	HENKEL AG & CO, KGAA
VESUVIUS PLC	COVESTRO AG
INCHCAPE PLC	BURELLE SA
CAIRN ENERGY PLC	PARROT SA
COMPASS GROUP PLC	PRODWARE SA
DAILY MAIL AND GENERAL TRUST PLC	ACCOR SA
ADIDAS AG	UBISOFT ENTERTAINMENT SA
COMPAGNIE GENERALE DES ETABLISSEMENTS MICHELIN SCA	DRAX GROUP PLC
KORIAN - MEDICA SA	GLENCORE PLC
VALEO SA	MICRO FOCUS INTERNATIONAL PLC
DEVOTEAM SA	DIALOG SEMICONDUCTOR PLC
DASSAULT AVIATION SA	WHITBREAD PLC
ROYAL DUTCH SHELL PLC	SCOUT24 AG
WPP PLC	UNITED INTERNET AG
UNILEVER PLC	DEUTSCHE POST AG
ROLLS-ROYCE HOLDINGS PLC	SNP SCHNEIDER-NEUREITHER & PARTNER SE
KINGFISHER PLC	SAP SE
BP PLC	ELIOR GROUP SA
QINETIQ GROUP PLC	PERNOD RICARD SA
BALFOUR BEATTY PLC	ILIAD SA
MEGGITT PLC	ORANGE SA
MBB SE	XPO LOGISTICS EUROPE SA
LANXESS AG	PLAYTECH PLC
OSRAM LICHT AG	STAGECOACH GROUP PLC
SIEMENS AG	IMPERIAL BRANDS PLC
ELIOR SA	ANGLO AMERICAN PLC