Share Repurchases and Repayments of Nominal Value: The Swiss Alternative to Dividends*

Philippe Mueller†
Columbia Business School

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†Division of Finance and Economics, 311 Uris Hall, 3022 Broadway, New York, NY 10027, USA, phone: +1 212 464 8228, fax: +1 212 932 2359, email: pm2025@columbia.edu.

Abstract

This paper examines the announcement effects of share repurchases and repayments of nominal value in Switzerland. Two-day excess announcement returns are estimated to be 2.3% and 1.6%, respectively.

This is roughly in line with findings from previous studies for several other markets. Furthermore, I find evidence that supports the free cash flow hypothesis as the main reason for cash disbursements through capital reductions. It seems that especially in the case of repayments of nominal value firms return cash to their shareholders because they do not have good investment opportunities at hand and not because they want to signal superior prospects. The results are less clear for repurchasing firms and the evidence suggests that some firms in the sample either want to signal that they are not fairly valued or at the very least try to time the announcement of the share repurchase.

Finally, I find a surprisingly high announcement effect for firms that announce a repayment of nominal value to substitute for the regular dividend payment. The excess returns in these cases can be explained neither by tax implications nor by any of the two alternative hypotheses considered.

1 Introduction

Before the revision of the corporate law in 1992, Swiss corporations did not pay out money by buying back and then canceling their own shares and thus dividends were the only means used in order to return cash to shareholders in Switzerland. Shortly after the revised law took effect, the first share repurchase program was announced and implemented in 1993 and since then more than 100 programs followed. In 2002, the amount of money paid to shareholders through share repurchases even exceeded the amount paid through dividends.[1]

The Swiss law also allows for a third alternative to payout cash: the repayment of nominal value. The nominal or face value of a share multiplied by the number of shares outstanding defines the capital stock of the firm and together with the agio or premium makes up for the amount that was paid in when the shares were first issued. If part of the nominal value is paid back there are no tax consequences because it is not considered a gain generated by the actions of the company but literally a repayment. Disgorging cash by means of repayment of nominal value started getting popular in the mid-nineties but experienced a surge in 2001 and 2002 after the legal minimum nominal value was further reduced from CHF 10 to CHF 0.01.

Since 1992, there have been about as many occurrences of redemption of nominal value as there have been share repurchases, however, only a total of CHF 14.6bn were distributed compared to CHF 61.1bn through share repurchases.

This paper examines the announcement effects of capital reductions, i.e. repayments of nominal value and share repurchase programs that are implemented with the intention of canceling the repurchased shares. While there are numerous studies on share repurchases even for Switzerland, repayments of nominal value have not yet been looked at in detail.[2] The results for share repurchases and repayment of nominal value are compared and the

[1] See Vontobel (2004).

[2] Studies on share repurchases in Switzerland include Dumont et al. (2004), Petri (2001) and Stauffer (2000) for example. The only study that also considers repayments of nominal value is Wabel (2003).

announcement effect is further examined by means of cross sectional regressions. I also try to examine what theory underlying changes in payout policies best explains the repayments of capital observed in Switzerland.

I find that the two-day excess returns for both, share repurchases and repayments of nominal value are significantly positive with 2.3% and 1.6%, respectively. Further examination of the announcement returns reveals evidence that supports the free cash flow hypothesis: firms with fewer investment opportunities (measured by comparably lower values of Tobin's Q) seem to have significantly higher announcement returns than firms with high Q-values. These findings are especially prevalent in the sample of firms that are repaying nominal value. However, firms in the share repurchase sample occasionally seem to signal undervaluation or at least try to time the announcement of the share repurchase.

I also find puzzling evidence that the market reacts significantly positive to the announcement that a dividend is substituted by a repayment of nominal value. Other than the fact that the repayment of nominal value is not taxed, such an announcement does not seem to convey a lot of new information as it generally can be assumed that dividends are sticky and thus a certain amount is already expected by the market for firms that pay dividends on a regular basis.

The paper is organized as follows. Section 2 gives an overview of the methods of repurchase used in Switzerland and highlights the institutional peculiarities of the Swiss market concerning both share repurchases as well as the alternative form of cash distribution, the repayment of nominal value. Section 3 then reviews some of the existing theories on share repurchases and summarizes the relevant empirical findings. The data and methodology are presented in section 4 while the empirical results are displayed and discussed in section 5. Section 6 concludes and explores possible extensions.

2 Returning Capital to Shareholders - The Situation in Switzerland

Before discussing the theoretical arguments in favor of conducting either a share repurchase or a repayment of nominal value in Switzerland,[3] one first needs to gather an understanding of the regulatory framework in the Swiss market, which consists of three interconnected pillars: legal requirements, tax consequences and stock exchange regulations. The institutional setting also predominantly determines which methods of repurchase are used in Switzerland. Notwithstanding the legal environment, returning capital to investors via capital reductions (either through SR or via RNV) has become very popular in Switzerland. In 2002, the cash distributed to shareholders by reducing the firm's capital stock was more than twice the amount distributed via dividends (CHF 24bn vs. CHF 11bn). And in all other years since 1998, more than a third of all cash was distributed via SR or RNV. Table 1 summarizes the cash distributions in Switzerland for 1992-2003.

2.1 Repurchase Methods

In Switzerland, shares are bought back using six different methods. Four of them are well documented in the literature: privately negotiated repurchases, open market repurchases and fixed-price or Dutch auction tender offers.[4] However, these otherwise popular methods account only for a minority of all repurchase programs executed in Switzerland. The predominant methods in Switzerland are SR via transferable put rights and SR using a second trading line.

If a SR is executed using transferable put rights, the investors receive a put option for every share they hold. Depending on how many shares the company wants to buy back, a predetermined number of puts gives the right to sell one share back at a given price. These

[3] Subsequently, SR and share repurchase(s) as well as RNV and repayment(s) of nominal value are used synonymously.

[4] See for example Grullon and Ikenberry (2000) and Peyer and Vermaelen (2005).

puts usually have a short time to expiration but can be traded in the market. Thus, all investors can reap the benefits if the exercise price is set at a premium and consequently there is no wealth transfer between tendering and non-tendering shareholders.

SR on a second trading line are a direct consequence of the tax implications discussed further below. This method is very close to open market repurchases since the company buys back shares at a price very close to the market price. The only difference is that the company is buying the shares on a separate trading line (as opposed to the open market) where it is the sole buyer.

2.2 Legal Requirements

Buying back and holding shares as treasury stock is allowed since the revision of the corporate law took effect on July 1, 1992. This does not mean however, that companies were not allowed to buy back their own shares as it is for example implied in Kim et al. (2003) or Dumont et al. (2004). Legally, nothing prevented firms from buying back their shares in order to reduce their capital with shareholder approval.[5] Given that share repurchases have become popular in the US already in the 80's it seems surprising that no Swiss company ever attempted to implement a share repurchase program before the revision of the law. Compared to the US or the UK markets, the 'legalization' of SR came with a significant lag, compared with other important markets such as Japan or Germany however (share repurchases were not legalized there until 1994 and 1998, respectively), Switzerland was still an early bird in adjusting its laws.[6]

A Swiss corporation is subject to minimum capital requirements. The minimum nominal value of equity or capital stock is CHF 100k.[7] This is hardly a restrictive constraint for companies listed on the main segment of the Swiss stock exchange (SWX), where the required market capitalization is at least CHF 25m. In addition to a requirement for the

[5] I thank Daniel Emch for pointing that out to me.

[6] See Kim et al. (2003) for a survey on repurchase regulation in the ten largest stock markets.

[7] Together with the agio, the capital stock is part of the paid in capital.

total nominal value of equity, there also exists a requirement for the minimum face value per share. Historically, the minimum face value per share was set at CHF 100. During the first revision of the corporate law it was reduced to CHF 10 and on May 1, 2001 the legal minimum was further reduced to CHF 0.01 with the aim of enabling firms to split their shares in order to "increase their liquidity and attractivity[8] ". In addition to splitting their shares, companies are also allowed to pay back any nominal value in excess of the minimum amount and thus reduce the total nominal value of the capital stock with shareholder approval. Again, apart from the minimum per share face value requirement, nothing should have prevented a company from paying back nominal value before 1992. Splitting shares only reduces the per share nominal value whereas RNV effectively reduce the capital stock.

As mentioned above, another way to reduce capital is by means of cancellation of repurchased shares. The cancellation of shares is subject to shareholder approval whereas the actual repurchase is not.[9] Companies are allowed to buy back up to 10% of the outstanding shares without shareholder approval.[10] If a company wants to reduce the capital by more than 10% it would either have to do it in several subsequent tranches[11] or it would need to get shareholder approval that the shares are to be canceled before the shares are repurchased.[12] Repurchased shares loose their voting rights and rights to cash flows. The law also requires that all shareholders are treated equally under equal premises. As a consequence, a company cannot offer a substantive premium in a tender offer since this would constitute an unequal treatment of tendering and non-tendering shareholders.

[8] Press release of the Federal Office of Justice, April 10, 2001.

[9] This is the main change that took effect with the new law.

[10] Up to 20% if the repurchase is in connection with the restricted transferability of registered shares.

[11] After previously repurchased shares have been canceled with shareholder approval.

[12] This was probably the case for example for Ems, which bought back 20.3% of the outstanding shares in 1993 (see Thommen, 1998).

2.3 Tax Consequences

Very generally, cash disbursements only have tax consequences when they come out of retained earnings. All cash that is paid out by means of reducing the companies' capital stock[13] is simply considered a reimbursement of a capital contribution and is not taxed. This means that a reduction of capital stock by repaying nominal value does not have any tax consequences for either the company or the shareholders.[14]

The situation is more complicated in the case of share repurchases. In Switzerland, capital gains are not taxed whereas dividends are taxed as ordinary income subject to a 35% withholding tax.[15] Thus, if a company buys back shares without intending to cancel them, any gains realized by the selling shareholder are tax free. However, if the repurchase is done in order to reduce the capital stock, anything paid in excess of nominal value is considered an excess liquidation proceed and is taxed as income and therefore also subject to the 35% withholding tax. As a consequence, an investor can make a loss on his investment in the repurchasing company and still be hit with a large tax since the share price might easily be much higher than the face value. It also means that the company should pay out only the nominal value plus 65% of the difference between the market price and the nominal value to the selling shareholder and pay the remaining 35% directly to the tax authorities. However, if the company buys back the shares in the open market, it cannot identify the sellers, hence cannot retain the withholding tax and thus pays the full market price for the shares. If these shares are later canceled, the company must eventually pay a tax of 53.84% on the difference

[13] Technically, this is a partial liquidation of the firm.

[14] Intuitively, this regulation makes sense as it intends to tax only cash that is earned through the companies' operations. However, there still remains an inconsistency in the tax consequences since, using the argument just made, the agio or the premium with which shares were issued in the first place should not be taxed either. The distinction between face value and premium therefore becomes very significant even though the contribution of the original investor is most likely to be exactly the same no matter what fraction is attributed to the face value. Consequently, the tax consequences become somewhat arbitrary and are not justifiable economically.

[15] This means that the company directly pays 35% of the dividend to the tax authorities, which can be reclaimed by the investors after they declare the dividend as income. Thus, there is a very high incentive for Swiss investors to declare all dividends since the marginal tax rate is generally below 35%.

between the face value and the price paid, which cannot be reclaimed by anyone.[16] The same tax rate is applied to treasury stock that is held longer than six years even when the shares are not intended to be canceled.[17]

Because of the huge tax burden, open market repurchases are not particularly suitable for the Swiss market if the aim of the repurchase is to cancel the shares.[18] The problem of having anonymous sellers has been solved by establishing a second trading line, where the only buyer is the repurchasing company. Thus, the company is able to divide the price of the repurchased shares between the amount the seller receives immediately and the withholding tax that is directly paid to the tax authorities. The gross prices on a the second trading line are slightly higher than in the open market to compensate investors for the opportunity cost they incur because of the time difference until they can reclaim the withholding tax. However, because of the tax consequences discussed above, only tax-exempt institutional investors and no individual shareholders are expected to participate in a repurchase program on a second trading line. Nevertheless, repurchasing shares on a second trading line has become the predominant method since it was initiated by Swiss Re in 1997.

Tax issues have also prevented the other popular method in Switzerland, repurchases via transferable put rights, from being used for a considerable time period. After the first program with this method was implemented in 1993 by SGS, tax authorities argued that the intrinsic value of the attributed put options was also subject to the withholding tax and should be treated as income. In addition, the usual tax consequences would apply when the shares are finally tendered. As a result of this double taxation, no more programs using this method were implemented until the Federal Court ruled in 1999 that the attributed options constitute a capital gain and therefore are not taxed. Since then, repurchases with put options have

[16] This tax is a result of the so-called 'grossing up': the tax authorities assume that the company has retained the withholding tax and paid out only 65% of the difference between the face value and the market price. The withholding tax is then calculated as $35\% \div (1 - 35\%) = 53.84\%$ or 35% of the grossed up price.

[17] Initially, the period a company can hold stock as treasury without incurring any tax consequences was set at only one year. In 1995 it was extended to two years and in 1998 to six years.

[18] Nevertheless and very surprisingly, one company has announced two open market repurchase programs with the aim of canceling the shares.

become the second most frequently used method to repurchase shares.

2.4 Stock Exchange Regulations

A public offer by a company to repurchase its own shares is considered a public takeover offer under the Federal Act on Stock Exchanges and Securities Trading (SESTA) and is therefore supervised by the Swiss Takeover Board (TOB).[19] The TOB can exempt a repurchasing company from the provision set forth in the SESTA. Firms repurchasing less than 2% of their own shares are generally exempt from the regulations governing public takeover offers. In addition, the TOB grants exemption via a reporting procedure if certain conditions are met. Common exemption requirements for fixed or market price repurchases for example include that no more than 10% of the outstanding shares are bought back, that the repurchase does not lead to a delisting of the company or that the offer affects all categories of shares outstanding. Additional requirements for fixed price repurchases (including repurchases via puts) state for instance that the offer shall not be made less than 10 days before the publication the company's financial result or that the offeror must adhere to the best price rule, which means that if it repurchases shares for a higher price than the initially offered price, it must offer this price to all shareholders. Additional requirements for market price repurchases include that the prices on a second trading cannot be more than 5% above prices paid on the first trading line or that the daily amount bought back on the main trading line should not exceed 25% of the usual daily volume. The company has to submit the request for exemption at least ten trading days prior to the planned start date of the repurchase program. If the TOB grants the exemption, the repurchasing company has to publish the offer such that it can be disseminated on a national scale, which usually means that it has to be made available to at least one of the principal electronic media specializing in stock market data.

RNV are not regulated by the SESTA; consequently, the TOB has no supervising authority

[19] More information on stock exchange regulations can be found on the TOB's website, www.takeover.ch.

and no reporting requirements exist although shareholder approval is needed before a RNV can be executed.

3 Reasons to Distribute Cash via Share Repurchases and Repayments of Nominal Value and Some Empirical Evidence

Share repurchases and dividend payments are the two main channels through which a company can give cash back to its shareholders. The closest analogue to a repayment of nominal value that can be found in the US market is probably the special dividend.[20] Very loosely speaking, the RNV could be considered as a tax free special dividend. Given that a company has considerable leeway in choosing how it wants to pay out cash, SR and RNV should not be examined without taking existing dividend policies into account in order to capture potential substitution effects. However, as many papers before, this study does largely ignore the dividend channel of distributing cash and only concentrates on SR and RNV leaving the empirical study of overall payout policies of Swiss companies as a future task. Allen and Michaely (2003) provide a neat overview of the state of knowledge on payout policies. They also summarize the existing evidence that repurchases are indeed used as a substitute for dividends in the US market.

The next section shortly reviews the two main theoretical explanations that can be applied to special dividends (or RNV for that matter), to SR and also to increases of the regular dividend: the information signaling and the free cash flow hypothesis.[21]

[20] See for example Howe et al. (1992) and DeAngelo et al. (2000) for evidence on special dividends. Just as it is the case with RNV, cash payouts through special dividends are usually smaller than amounts paid through SR. Furthermore, special dividends also do not bear any implicit commitment to repeat the higher cash payout in the future - as opposed to an increase of the regular dividend.

[21] These two hypotheses are mentioned as the main reasons to buy back shares in many papers including for example Grullon and Michaely (2004), Nohel and Tarhan (1998) or Perfect et al. (1995). For additional theoretical reasons to buy back shares see for example Grullon and Ikenberry (2000). See Lang and

3.1 Information Signaling vs. Free Cash Flow Hypothesis

At the basis of the information signaling hypothesis lays the notion that there is asymmetric information between the investors and the firm's managers. Through changes in the firm's payout policy, the managers convey information about future prospects to the market.[22] In that sense the announcement of a either a SR or a RNV signals higher expected future earnings and cash flows compared to the market's expectation ('cash flow signaling'). As Grullon and Michaely (2004) point out, this version of the information signaling hypothesis has three immediate implications: The announcements should be accompanied by positive abnormal returns and immediately followed by positive changes in the market's outlook on future profitability. And eventually, the announcement should be followed by positive news about profitability or cash flows. A variant of the information signaling hypothesis also widely used as a justification for SR takes a slightly different view. It assumes that managers are not so much conveying private information about future prospects but merely expressing their disagreement with how the market values their firm ('undervaluation signaling').[23] The managers buy back the firm's shares because they consider them a 'good investment' at the current price. Obviously, this reasoning cannot be applied to RNV as there is no way for the company to benefit from a low share price while distributing cash. Furthermore, this explanation has also only limited applicability to SR that are implemented with the intention of canceling the repurchased shares. Buying back the shares cannot be considered an 'investment' in that case.[24]

The free cash flow hypothesis argues that firms with excess cash and poor investment opportunities are more likely to invest in bad projects, thus destroying shareholder value. For example Jensen (1986) suggests that forcing managers to return cash to shareholders can

Litzenberger (1989) for an evaluation of the two theories in the context of dividend increases, Howe et al. (1992) examine the empirical evidence for special dividends.

[22] See for example Miller and Rock (1985) and Vermaelen (1984) for theoretical models how payout decisions can be rationalized as costly signals revealing private information.

[23] See for example Ikenberry et al. (1995) or Weston and Siu (2003).

[24] However, implementing a SR program when the firm is undervalued would still prove beneficial as more shares can be retired for the same amount of cash.

significantly reduce agency costs and effectively prevent over-investment in value-destroying projects. Grullon and Michaely (2004) summarize the implications of the free cash flow hypothesis as follows: firms repurchasing their shares should experience a decline in their profitability and should need less cash for investments. In addition, they should experience a decline in their systematic risk, thus reducing their cost of capital. Finally, the announcement effect should be larger for firms that are more likely to over-invest, i.e. firms that have fewer investment opportunities (which is generally measured by low values of Tobin's Q) and a lot of excess cash.

3.2 Empirical Evidence

The positive announcement effect for SR and special dividends is well documented in numerous papers, a summary of the results for SR can be found in Allen and Michaely (2003).[25] In the US, the announcement of an open market share repurchase program results in an excess return of about 3% on average, the effect being positively related to the portion of outstanding shares that are planned to be purchased. Price reactions for fixed-price or Dutch auction tender offers are significantly higher with 8% and 12%, respectively. Peyer and Vermaelen (2005) find an excess return of 1.8% for a sample of privately negotiated offers. Prior to the announcement, empirical studies find a decrease in the stock price, which at the very least suggests that managers try to time the announcement to exploit a perceived undervaluation of the stock. Howe et al. (1992) and Lie (2000) both find excess returns of about 3.5% for announcements of special dividends.

There also exist a number of studies for several international markets. As mentioned above, there exists a recent study for the Swiss market. Dumont et al. (2004) find announcement returns of 1%, 1.3%, 4.9% and 1.8% for SR executed through a second trading line, tender offers, transferable put rights and buybacks in the open market, respectively. Announcement effects reported for open market repurchases in other countries are as follows: 0.9% in the UK

[25] Additional papers include for example Vermaelen (1981), Comment and Jarrell (1991), Bagwell (1992) or Ikenberry et al. (1995).

(Rau and Vermaelen, 2002), 3.9% in Germany (Schremper, 2002; 7% for fixed-price tender offers), 0.6% in France (Ginglinger and L'Her, 2002), 1.1% in Canada (McNally, 2002) and about 2% in Japan (Hatakeda and Isagawa, 2004). Although all the results are for excess announcement returns, comparing them requires some caution as the announcement window is not always the same.

The literature on what theory best explains why firms repurchase their own shares is still not quite conclusive. Earlier papers such as Vermaelen (1981), Dann et al. (1991) and Howe et al. (1992) seem to find more support for the information signaling hypothesis whereas more recent papers such as Perfect et al. (1995), Nohel and Tarhan (1998), Lie (2000) and Grullon and Michaely (2004) generally conclude that the free cash flow hypothesis is better able to explain the empirical findings.

4 Data and Methodology

This section discusses the data used in the study and describes the event study methodology that is applied.

4.1 Data

The sample used in the study consists of a total of 183 announcements of share repurchase programs and repayments of nominal value[26] made by Swiss companies between 1993 and 2003.[27]

The announcement dates are collected from several publicly available sources, the main source being the Neue Zuercher Zeitung (NZZ), the most prestigious newspaper in Switzerland for financial news In addition, announcement dates are also obtained from Finanz und

[26] Subsequently, I use 'event' to mean both SR and RNV.

[27] Originally, the sample consisted of 256 announcements. A total of 27 investment companies were excluded. In addition, I exclude events for several reasons such as: shares were not intended to be canceled, the announcement was for a continuation of an ongoing program, data was not available or unreliable etc.

Wirtschaft, a bi-weekly financial newspaper as well as from Reuters. The collected information was checked and completed by consulting other publications (for example Vontobel, 2004, or Finanz und Wirtschaft, 1992-2004) or previous studies on share repurchases (Welti, 2001; Buerki, 2002).[28] Following standard practice, the announcement date is defined as the last trading day before the publication of the first article mentioning the event. Given the interest in financial data, it seems fair to assume that the chosen announcement date corresponds indeed to the day the public learns about the event in question - for otherwise, it would be mentioned in the newspaper earlier. Since share repurchase programs are subject to regulation and must be approved by the Swiss takeover board (TOB), there is the possibility of choosing an alternative announcement date, namely the agreement date from the TOB, which is the first date the company is allowed to announce the program. Dumont et al. (2004) use this data set in their paper on share repurchases. Unfortunately, the TOB data are not available for this study; therefore, a comparison between the two different dates is not possible. However, as Dumont et al. (2004) also note, it is not at all certain that the TOB date actually corresponds to the announcement date and they also find some evidence that it is not the case. Therefore, and as argued above, it does not seem out of line to assume that the NZZ data is accurate in capturing the moment the information on the events is conveyed to the public. In addition, companies planning a repayment of nominal value do not have to file with the TOB, which means that using data from the NZZ for the whole sample is at the very least a consistent way of proceeding.

The main drawback of using newspaper data is that the additional information (apart from the actual announcement date) is not always complete and might even be inaccurate. First and foremost, I distinguish between SR and RNV, having a total of 71 observations of the former and 105 observations of the latter. The remaining 7 observations are announcements of both, a SR in addition to a RNV. The SR can be further divided according to the repurchase method. I distinguish a total of six methods: open market repurchases, repurchases on a second trading line, fixed-price tender offers, Dutch auction tender offers, repurchases via

[28] A significant part of the announcement dates were collected by Greg Wabel and were previously used in Wabel (2003).

transferable put rights and privately negotiated repurchases. For four observations, the information on the repurchase method is missing. Dumont et al. (2004) exclude privately negotiated offers and do not distinguish between fixed-price and Dutch auction tender offers. If I do the same with my sample and also exclude events classified as 'miscellaneous' or with missing information, I end up with only 60 SR compared to the 83 observations reported by Dumont et al. (2004) for the same period. Some of the missing events can be explained for example by the fact that I exclude share repurchases that are not aimed at retiring shares or that I have the classification 'miscellaneous' to control for observations where firms announce a SR and a RNV at the same time. However, it is obvious that the TOB data would come in very handy in order to correct inaccuracies or errors in the newspaper data on the characteristics of the several repurchase programs, especially the number of shares to be repurchased. Not being able to match the two samples also makes it more difficult to compare the results of the two studies.

Data on individual stock and stock market index prices, as well as additional data on characteristics of the companies are all taken from Datastream. Tobin's Q is estimated as the ratio of the sum of the last available book value of total debt and the three month daily average market value of equity and the sum of the book values of total debt and equity. The fraction of the outstanding shares repurchased is generally taken as a percentage of outstanding shares sought taken from the article first mentioning the event. In some cases and generally for RNV, the total amount of cash to be distributed is given and the fraction is calculated by dividing the amount by the market value of equity two days before the announcement date. Table 2 presents some summary statistics sorted according to the different distribution methods and will be discussed in more detail in section 5.

4.2 Econometric Methodology

Following the convention in Campbell et al. (1997), the announcement effect of a SR program or a RNV is measured using simple daily abnormal returns:[29]

$$\epsilon_{it}^{*} = R_{it} - \mathrm{E}[R_{it}|X_t], \tag{1}$$

where ϵ_{it}^{*}, R_{it} and $\mathrm{E}[R_{it}]$ are the simple abnormal, actual and normal (i.e. expected) returns, respectively, given the conditioning information X_t for the time period t.

Under the assumption that stock returns are jointly multivariate normal and independently and identically distributed through time the normal return can be estimated with the market model using the Swiss Performance Index (SPI) as the proxy for the market (i.e. the market return is the conditioning information). The SPI is a dividend adjusted performance index that includes all Swiss companies listed on the Swiss stock exchange SWX with a minimum free float of 20%. To correct for potential biases due to thin trading I use Scholes and Williams (1977) betas instead of the simple OLS estimates.

$t = 0$ defines the event date. The parameters of the market model are estimated over an estimation window of $L_1 = 252$ days ranging until $t = -11$ days before the event date. Given the estimates of the market model, I estimate and analyze the abnormal returns $\hat{\epsilon}_{it}^{*}$ over a maximum event window of $L_2 = 36$ days (ranging from $t = -10$ to $t = 25$). Given the assumptions on the behavior of stock returns and with a large estimation window, the abnormal returns will be independent asymptotically and $\hat{\epsilon}_{it}^{*} \sim N(0, \mathbf{V}_i)$.[30]

Define $CAR_i[t_1, t_2]$ as the estimated cumulative abnormal return for a subperiod within the event window starting at day t_1 and ending at t_2 and let γ be a $(L_2 \times 1)$ vector with ones in positions t_1 to t_2. $CAR_i[t_1, t_2]$ is then calculated by summing up the $\hat{\epsilon}_i^{*}$'s over the defined subperiod with length $T = t_2 - t_1 + 1$. The variance of $CAR_i[t_1, t_2]$ is equal to $\gamma' \mathbf{V}_i \gamma$.

[29] This part draws heavily on Campbell et al. (1997), chapter 4: *Outline of an Event Study.*

[30] For an exact expression for the variance estimate see Campbell et al. (1997), p. 159f.

The so-called standardized cumulative abnormal return ($SCAR_i$) can be estimated by simply dividing the CAR by its estimated standard deviation. The $SCAR$ is student t with $L_1 - 2$ degrees of freedom.

Cumulative average excess returns over N securities and over the chosen window from t_1 to t_2 are calculated as follows:

$$CAAR[t_1, t_2] = \frac{1}{N} \sum_{i=1}^{N} CAR_i[t_1, t_2]. \tag{2}$$

The variance is given by:

$$\text{var}\big[CAAR[t_1, t_2]\big] = \frac{1}{N^2} \sum_{i=1}^{N} \text{var}\big[CAR_i[t_1, t_2]\big] = \frac{1}{N^2} \sum_{i=1}^{N} \gamma' \mathbf{V}_i \gamma. \tag{3}$$

The null hypothesis that a given event has no impact on the mean and variance of returns can be tested with two different test statistics, J_1 and J_2, respectively:

$$J_1 = \frac{CAAR[t_1, t_2]}{\text{var}\big[CAAR[t_1, t_2]\big]^{\frac{1}{2}}} \sim N(0, 1) \tag{4}$$

and

$$J_2 = \frac{N(L_1 - 4)^{\frac{1}{2}} \overline{SCAR}[t_1, t_2]}{L_1 - 2} \sim N(0, 1), \tag{5}$$

asymptotically, where $\bar{SCAR}[t_1, t_2]$ is the mean $SCAR$ over the chosen window for the N events.

The difference between the two statistics is that J_1 gives equal weight to the realized cumulative abnormal return of each security, whereas J_2 gives more weight to securities with lower abnormal return variance. If the true abnormal return is constant, then J_2 will be the better choice; if the true abnormal return is increasing with higher variance it is wiser to opt for J_1.

As mentioned above, the event window over which abnormal returns are computed and plotted ranges from $t = -10$ to $t = 25$ days. The announcement returns reported in section 5 are calculated over the $[0, 1]$-window. This approach assumes that the markets are efficient

and prices react fairly immediately to new information. Using a two day window takes into account that the information can be revealed to the market either during or after the trading day. If the information becomes available during the day, the announcement effect should already be reflected in the day 0 abnormal return. If the information is released after the closing of the market, the price reaction can only occur on the following day. Taking information from newspapers, there is no way to exactly determine when the information is available to market participants. In addition to the two-day returns, I also calculate $CAAR$ over the $[0, 10]$-window.

Table 2 also contains the median values of an undervaluation proxy. This proxy is calculated with the same methodology as above and represents the cumulative abnormal returns over a four month window ending the day before the start of the event window as defined above. The estimation window to determine the market model parameters remains one year.

In order examine the determinants of the announcement returns, the cumulative abnormal returns over the $[0, 1]$-window are cross-sectionally regressed on a number of variables, including the undervaluation proxy. The empirical results are presented and discussed in the next section.

5 Empirical Results

5.1 A First Look at the Summary Statistics

This section presents the empirical results of the event study and the cross-sectional regression. Table 2 presents some summary statistics of firms either repurchasing shares or repaying nominal value sorted according to the different distribution methods. Panel A displays the market values of the companies two days before the announcement, panel B contains the fractions of capital disbursed either as fractions of outstanding shares to be repurchased or as fractions of the market value that is repaid as nominal value. Panel C finally contains the medians of other characteristics such as Tobin's Q or cash holdings. It

is obvious that on average, repurchasing firms are larger, have higher Q values, are more undervalued prior to the announcement date and buy back a larger fraction of the market value of equity than repaying firms distribute. Corresponding to the higher market value, cash holdings are also bigger for repurchasing firms. However, if cash holdings are adjusted with the market value of equity, the difference becomes much smaller. Within the category of share repurchases, larger firms tend to buy back their shares in the open market via a second trading line. Taking median values, the largest fractions are repurchased via fixed price tender offers. At the same time, firms using this method also exhibit positive abnormal returns in the four months prior to the announcement. Taken over all events, the cumulative abnormal returns of firms reducing their capital are practically equal to zero prior to the announcement date.

The statistics displayed in table 2 are somewhat troubling for the free cash flow hypothesis; especially the high Q-values seem to suggest that firms that reduce their capital are not very likely to over-invest in the first place. However, this conclusion hinges on the assumption that (i) Tobin's Q is a good proxy for investment opportunities and that (ii) the estimated Q-value is indeed accurate.[31] Considering the median Q-values for the SR and RNV sample, it seems as if firms that are relatively more likely to over-invest (firms with lower Q-values) tend to disburse cash by means of repaying nominal value instead of repurchasing shares.

Table 2 also leads to the conjecture that repurchasing firms are at the very least timing the repurchase, if not signaling undervaluation. Not surprisingly, this timing effect seems completely absent in the sample of firms that repay nominal value since they cannot benefit from lower stock prices.

[31] Using Tobin's Q as a proxy for investment opportunities is fairly standard, so even if it is not a good measure it seems justifiable to use it at the very least to get comparable results. The second part of the assumption might be more critical in the current case since data on balance sheet items are only available on a yearly basis and often with very little history. This means that the estimated Q-values tend to become more inaccurate the later in a year an announcement occurs. Furthermore, it was not possible to calculate long-run Q-values for the whole sample. Thus, all inference made based on the estimated values for Tobin's Q should be treated with caution.

5.2 Cumulative Average Abnormal Returns for Different Subsamples

Figure 6 displays the average abnormal and the cumulative average abnormal returns ($CAAR$) of all 183 events in the sample. The picture looks quite satisfactory from an efficient markets point of view - average abnormal returns fluctuate around zero over the whole event window except for the two-day announcement period. Accordingly, the $CAAR$ exhibit a jump during the $[0, 1]$-window and then slightly continue to drift upwards thereafter.

The $CAAR$ for the $[0, 1]$- and the $[0, 10]$-window as well as both J-statistics are displayed in table 3. Table 3 also contains the same information for a number of subsamples. For the total sample, the $CAAR$ over the two-day event window is 1.85% and highly significant under both test statistics. Over a ten-day window, the $CAAR$ is slightly higher with 2.4% and still highly significant. $CAAR$ for the SR sample are above the values for the total sample with 2.33% and 3.29%, respectively. Consequently, $CAAR$ for the RNV sample fall below those values with 1.58% and 1.97%, respectively. All $CAAR$ however are still highly significant (all J-values above 2.8). The t-statistic for the difference in means between SR and RNV is 1.90 and 1.39, respectively, meaning that for the $[0, 1]$-window the difference is at least significant on the 10% level. t-statistics for differences in means between different subsamples are provided in table 4. Given the announcement effects for SR and RNV, it is rather surprising that the subsample labeled $BOTH$ that effectively contains only observations where both, a SR and a RNV are announced, exhibits very low $CAAR$ with 1.12% and -0.002%, respectively. However, the strange results for the $BOTH$ subsample might also be due to the small size. For further investigations, these events are no longer considered. Figure 6 contains plots of the $CAAR$ and the average abnormal returns of the SR and RNV sample, respectively.

5.2.1 Share Repurchases

Figure 6 provides the plots for the $CAAR$ for the different repurchase methods. The numerical results for the different methods can be found in panel B of table 3. Some of the $CAAR$ are

very volatile, which again is most likely a result of the small sample sizes for a few of the methods. This might also be the explanation for the negative $CAAR$ of the Dutch auction tender offers (only four observations) over the $[0, 1]$-window, especially given that all other announcement returns are positive. Somewhat surprisingly, the results displayed in panel B differ quite significantly from what Dumont et al. (2004) find. Their announcement returns are smaller for three of the four methods they distinguish when windows are taken to be comparable. Especially for repurchases on a second trading line, the differences are striking: they report an announcement return of about 1% for the $[-2, 2]$-window, whereas I find an excess return of almost 2.6% for the same period.[32] As discussed before, this might be due to the fact, that their sample is not always able to capture the date the news are conveyed to the public.

Announcement returns over the $[0, 1]$-window are highest for repurchases with transferable put rights (4.0%). This is not very surprising as this method represents a very strong commitment of the company to buy back a certain number of shares at a given price. However, over the $[0, 10]$-window, repurchases on a second trading line exhibit higher excess returns (5.1% vs. 4.4% for repurchases with put rights), although the difference is not statistically significant (the t-statistic is equal to 0.35). Repurchases with put rights have announcement returns that are significantly higher on the 5% confidence level than those of most other methods.[33] The only method that does not have significantly lower excess returns over the $[0, 1]$-window are repurchases via fixed-price tender offers. Interestingly enough, fixed-price tender offers however, do no longer exhibit any positive abnormal performance when measured over the $[0, 10]$-window.

5.2.2 Repayments of Nominal Value

I also divide the RNV sample into different subsamples. The first subsample includes the RNV where the repayment simply replaces the dividend. An announcement falls into this

[32] Results for the $[-2, 2]$-window are not displayed.
[33] Not all pairwise t-statistics discussed in the text are reported.

category if it is either explicitly mentioned in the press that the RNV is thought as a replacement of the dividend or if the RNV takes place instead of a dividend payment and the actual amount paid is roughly equal to the dividend amount paid in the previous year. This sample thus intends to capture the events where the announcement to repay part of the nominal value cannot be considered an exceptional event because the market should have expected that the company would pay out roughly the announced amount in the form of dividends (the underlying assumption here is that dividends are sticky and that expectations about dividend payments in the near future are built on the recent dividend history). Accordingly, I call this subsample 'dividend substitution' or DS. A second subsample includes all events where a RNV is made in addition to the regular dividend payment or where it either partly or fully replaces the regular dividend payment but the amount paid out is considerably increased. In short, these events represent a significantly higher payout when compared to the last dividend payment, i.e. a payout the market is unlikely to have expected. Thus the name 'dividend increase' or DI. The third subsample includes all announcements that could not be put in any of the two previous categories. In most cases, the sample contains announcements of RNV that come as a surprise and are unrelated to the announcement of a regular dividend payment. Therefore the subsample is labeled 'stand-alone' or SA. All the RNV are part of only one of the three subsamples just described. They contain 48, 17 and 40 observations respectively, which means that almost half of all RNV are intentionally labeled as substituting a dividend payment or they effectively do so. In addition, I construct two more subsamples: the first one contains all events were I have the information that in addition to the announcement of a RNV the company also either announced a stock split or the simplification of the shareholder structure by creating only a single class of shares.[34] This sample is called 'other news' or ON and contains 26 observations. The second additional subsample excludes from the DS sample all events that are in ON as well. This sample is named 'dividend substitution ex other news' or $DSXON$ and contains 8 observations less than the DS sample.

[34] Many companies in Switzerland used to have several classes of shares, mainly bearer and registered shares.

Figure 6 displays the $CAAR$ plots for the RNV subsamples except $DSXON$. Rather unsurprisingly, DI's exhibit clearly higher returns than DS's. On the other hand, the results for SA and ON (both exhibiting returns below those for the DI sample and even below those for the DS sample over the $[0, 10]$-window) are not so easily explainable. First of all, there does not seem to be any reason, why a dividend substitution should have a higher impact on the stock price than an additional cash payout. Secondly, if the market is informed that the dividend increases in the DI sample are not permanent, it should also not matter, whether the announcement of a repayment of nominal value is made concurrently with the announcement of dividends or as a separate stand-alone announcement. As far as the ON sample is concerned, it is not obvious why the announcement of a stock split or a simplification of the classes of shares should negate the positive effects of a RNV and essentially lead to a null effect. One possible explanation might be that the market does not like stock splits since by splitting the shares the company effectively wastes an option to return money tax free to its investors. However, this should be examined further by including additional information on stock splits. The $CAAR$ for the $[0, 1]$- and the $[0, 10]$-window are displayed in panel C in table 3. The numbers confirm what can be seen in figure 6. DI $CAAR$ are 2.4% and 4.3%, respectively and both highly significant. SA and DS $CAAR$ over the $[0, 1]$-window are lower with 1.7% and 1.1% but still highly significant. Over the longer window, both returns are approximately equal and also both are no longer significantly different from zero on any levels conventionally considered. ON $CAAR$ are the lowest of the all subsamples and no longer significantly different from zero (if we consider J_2 to be the appropriate test statistic, then the $CAAR[0, 1]$ is at least significant on the 10% level). ON $CAAR$ however are significantly different from $DICAAR$ for both windows (5% level for $[0, 1]$-window and 10% level for $[0, 10]$-window) and from the SA $CAAR[0, 1]$ (t-statistics not reported). Otherwise, $CAAR$ between the different subsamples are never significantly different from each other on the 10% level (see also table 4).

After having examined the numbers in panel C of table 3 the puzzles mentioned above still remain. Especially the high and significant announcement effect of the DS sample

seems striking and is hard to explain. The return is even slightly higher if we only consider the $DSXON$ subsample that excludes all observations that are in the ON sample as well. The announcement effect observed cannot be explained by any of the theories discussed in section 3. The undervaluation variant of the information signaling hypothesis is definitely out of question since the company is not investing in its own shares. Both the standard information signaling hypothesis and the free cash flow hypothesis cannot be applied either, since the company simply pays out the exact same amount that it would have paid out as a dividend otherwise. It seems reasonable to assume that the market at the very least should expect this given that dividends are considered to be sticky. Therefore, there must be some other reason that lets the market participants react so heavily positive. One obvious possible explanation is of course that repayments of nominal value are not taxed as opposed to dividend payments. Knowing how much will be paid out, the investors could immediately calculate how much more after-tax return they get if they receive the cash via a RNV and not via a dividend payment. Discounting the additional gain to the present would then give the amount we expect the investors to bid up the current price. In order to check whether this explanation accounts for the rather large $CAAR$, I approximate an expected price increase by taking both an average and a maximum marginal personal tax rate[35] and multiplying it with the fraction of market value that is repaid. The resulting expected price effect is most likely slightly upward biased as I do not discount it. The $CAAR$ for the DS sample are then recalculated using only the excess individual CAR over the expected price increase. The results of this exercise are displayed in table 5. The conclusion is plain and straightforward: the tax savings cannot account for the significant announcement returns in the DS sample and the puzzle still remains. The effect could potentially be explained if the companies in the sample overwhelmingly release additional information at the announcement date. This seems possible because of the nature of the DS sample: companies announcing a dividend substitution do this when they would otherwise announce the dividends for the

[35] The marginal personal tax rates are taken from www.bioalps.org, a website that promotes business in the Lake Geneva region. According to the available information, the average marginal personal tax rate is about 25%, whereas the maximum rate is about 33%.

year. However, the likelihood that additional information is released does not explain why the news should be greeted so positively on average. This would imply that the companies in the sample overwhelmingly exceed the market's expectations. In any case, the issue requires further investigation with a potentially extended information set.

5.2.3 Tobin's Q and the Free Cash Flow Hypothesis

As mentioned in section 3, the information signaling and the free cash flow hypothesis have different implications for the repurchasing (or repaying) firms. Since I only look at announcement period returns, not all implications will be examined. In order to examine whether firms that are more likely to over-invest exhibit higher abnormal returns, I split the sample according to the Q-values. Following Perfect et al. (1995), I first split the total sample into firms with Q-values above one and firms with Q-values below one (I label the subsamples $TQA1$ and $TQB1$, respectively), those in the latter sample being considered as more likely to over-invest. The $CAAR$ for both subsamples are plotted in figure 6. Firms with Q-values below one do in fact exhibit higher announcement returns than firm with Q-values above one. However, since about 4/5 of all firms in the sample have a Q-value greater than one, the results for those firms are not very conclusive. I therefore construct two other samples, namely one sample with the firms that have Q-values in the lowest quintile and another with firms that have Q-values in the highest quintile (the samples are named $TQ20$ and $TQ80$, respectively). The plots for those $CAAR$ are also displayed in figure 6. The $TQA1$ and the $TQ20$ sample are almost identical (since only about 1/5 of all firms have a Q-value below one), whereas the $TQ80$ sample contains much fewer observations than the $TQB1$ sample. The plots do seem to support the predictions of the free cash flow hypothesis as firms that are unlikely to over-invest (firms in the highest quantile) do not seem to exhibit positive abnormal returns on average. Panel A in table 6 contains the $CAAR$ for the different subsamples and the two windows considered; the t-statistics for differences in means are displayed in table 7. Panels B and C in table 6 contain the results for the same subsamples for SR and RNV, respectively.

In all cases and for both windows considered I find that the subsample containing the firms with lower Q-values has a higher $CAAR$ than the corresponding subsample with higher Q-value firms. However, the differences are not always statistically significant. For the $[0, 10]$-window, the difference between $TQ20$ and $TQ80$ is statistically significant on the 10% level (t-statistic equal to 1.78). For the two-day window, the quantile differences for the whole sample and for the RNV are both highly significant (t-statistics equal to 3.4 and 3.0, respectively). The cash flow hypothesis seems to be rather strongly supported in the total sample and in the subsample of the repaying firms. For repurchasing firms, the difference in $CAAR$ is too small given the sample size to be statistically significant.

The results are consistent with the hypothesis that firms wishing to signal information to the market rather do so via share repurchases, whereas firms that intend to disburse excess cash are more prevalent in the RNV sample. It is also consistent with the previous observation that firms that are repaying nominal value are not undervalued on average prior to the announcement and that their median Q-values are lower than those of repurchasing firms.

5.3 Cross-Sectional Regressions

In order to conclude the empirical analysis I regress a number of variables on the two-day CAR for the single observations. The results of the cross-sectional regressions are displayed in tables 8-10. Table 8 contains the results for the whole sample whereas tables 9 and 10 contain the estimations for SR and RNV, respectively.

The cross-sectional regressions provide at best mixed support for the findings in the previous section. In model 1, I regress the CAR on a constant, the log market values and the log fractions as defined earlier. All parameters are significant at the 5% level for the whole sample but only one coefficient is for the subsamples (namely the fraction coefficient for RNV). However, all signs are in line with expectations: the more a company redistributes measured as a fraction of market value, the higher the resulting CAR and the larger a company is in terms of market value, the smaller the announcement effect. The first effect

is consistent with the notion that a higher payout is a more costly and thus more credible signal. The latter is consistent with the information signaling hypothesis that assumes that information asymmetries are higher for smaller firms - a signal via changes in the payout policy thus is expected to have larger effect. The insignificant coefficient for the RNV is also consistent with the ad hoc hypothesis mentioned in the previous section that firms that wish to convey a signal about their quality prefer SR to RNV. However, the insignificance of the coefficients for the SR sample are less easily explainable and at best simply do not provide additional support for the information signaling hypothesis.

In model 2 I add the Q-values to the regression. The results are in line with the expectations under the free cash flow hypothesis since the coefficient for all samples is negative. However, it is also never significantly different from zero. Instead of the Q-values, I use dummy variables for the top and bottom quintiles as defined earlier in the third specification. The results now become rather puzzling as both coefficients become negative for all samples - the results in the previous section in line with the free cash flow hypothesis nurtured the expectation that the coefficient for the bottom quintile would be positive. It is somewhat consoling that the coefficient on the $TQ20$ dummy variable is never significant, whereas the coefficient on the $TQ80$ dummy is significantly negative on the 5% level for the whole sample and almost on the 5% level for the SR. This suggests that for firms with high Q-values, i.e. firms where the market believes that they have many good investment opportunities, it is indeed a bad signal if they decide to disburse large amounts of cash.

In order to test another implication of the free cash flow theory, I add another variable to the estimation: the log of the adjusted cash holdings (model 4). The theory predicts that higher cash holdings (which make a firm more likely to over-invest) would result in a higher announcement effect if the firm eventually decides to return some of the cash to its shareholders. Again, the results can only partially be taken as a support for the free cash flow hypothesis: although the variable has a positive effect in all samples, it is never significantly different from zero.

Finally, I add the undervaluation proxy and a dummy for RNV to model 4 for the whole

sample (model 5). Both estimated coefficients are not significant. This leads to the conclusion that once we control for a number of variables, the channel through which cash is paid out is no longer relevant in determining the announcement effect, a result that also seems fairly intuitive. The undervaluation proxy is also not significant when it is added to either of the two subsamples (models 6 and 7). Lastly, I add a dummy variable for the ON sample as defined earlier in model 7 for the RNV. The estimated coefficient is negative as it could be expected based on the results in the previous section, however, it is also not significantly different from zero.

Adjusted R^2 are highest for all samples for model 3, which suggests that adding the additional variables does not really improve the model.

Although some of the results reported in section 5 are rather weak, the sum of the evidence is mainly consistent with the free cash flow hypothesis. It seems that especially in the case of RNV firms return cash to their shareholders not because they want to signal superior prospects but because they do not have good investment opportunities. The results are less clear for repurchasing firms, which seems to suggest that if firms want to convey private information, they prefer to do so via SR instead of RNV.

6 Summary and Concluding Remarks

In this paper I examine the announcement effects of capital reductions in Switzerland that include share repurchases and repayments of nominal value. For the total sample I find an average two-day excess return of 1.85%. The excess return for SR is 2.33%, whereas the effect for RNV is slightly below with 1.58%, both being highly significant. On average, SR are used by larger firms that also return a higher fraction of the market value of equity to its investors. $CAAR$ differ significantly between different repurchase methods. Repurchases via transferable put rights exhibit the highest excess returns with 4% followed by 2.6% for fixed price tender offers. This is not surprising given that these two methods signal a very strong commitment by the company to buy back the planned number of shares. SR on a second

trading represent the most widely used method in Switzerland. The average announcement return for this method is about 2.1%.

The highest two-day returns for RNV can be found for a subsample of firms that supplement their regular dividend payment with a RNV. The $CAAR[0,1]$ for this subsample is 2.4%. Surprisingly, RNV still exhibit a significant average announcement return of 1.1% if the RNV simply replaces the regular dividend. This is remarkable since it is not obvious what new information is actually revealed to the market in these cases other than the announcement that the regular (and expected) dividend payment is made through a channel that makes it tax free. Thus, one would assume that the price reaction would simply be equal to the discounted tax on the dividend that now ends up in the investors' instead of the government's pockets. However, the observed $CAAR[0,1]$ is much bigger even after taking the tax gain into account. Thus, the question why the market reacts so positively to an announcement that does not reveal a lot of new information definitely requires further investigation.

Examining the announcement effects for different subsamples sorted according to Q-values I find some evidence in support of the free cash flow hypothesis: firms with fewer investment opportunities (lower Q-values) have higher abnormal returns whereas firms with high Q-values exhibit zero or even negative abnormal returns on average. This finding is especially prevalent in the RNV sample suggesting that this method is well suited for firms that wish to return cash to their shareholders not because they want to signal superior prospects but because they do not have good investment opportunities readily available. Although the results for SR are not completely different, it seems that firms are more likely to signal information through SR instead of RNV. On the one hand, the effects supporting the free cash flow hypothesis are less easily detectable; on the other hand, I find that repurchasing firms on average underperform the market in months before the announcement suggesting that firms either react to perceived undervaluation or that they at least try to time the start of a SR.

There are potentially a few extensions to this paper. First of all, an examination of the operating performance after the announcement of a reduction of capital would complement

the available evidence needed to evaluate the two competing hypotheses. This would also allow better distinguishing between the cash flow signaling and the undervaluation signaling versions of the signaling hypothesis. At the same time, it should also be possible to draw further conclusions under what circumstances firms would prefer either SR or RNV. Furthermore, the issue why the market values announcements of dividend substitutions so highly requires a second look, possibly with an extended information set. And last but not least, it remains to be examined what happens as the firms come closer to the minimum nominal value. After all, RNV are only a transitory way of returning cash to the shareholders as the total amount that can be distributed through this channel is bounded by the nominal value of the shares. Consequently, one would also need to incorporate stock splits into the analysis, since they are another method of reducing the nominal value per share. This analysis might possibly explain the weak effect of concurrent stock split and RNV announcement since the firm effectively forfeits an option to return money tax free to investors every time it splits its shares.

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Table 1: Cash disbursements in Switzerland 1992-2003

Year	Share repurchases	Repayments of nominal value	Dividends
1992			5,507
1993	644		5,579
1994	247	42	6,562
1995	0	106	7,214
1996	282	413	7,872
1997	1,236	1,836	8,530
1998	4,910	309	9,932
1999	10,169	252	13,332
2000	7,800	169	16,674
2001	11,160	4,051	17,784
2002	18,307	6,005	10,661
2003	6,394	1,438	12,585
Total	61,149	14,621	116,725

Numbers are in million CHF. The table is taken from Vontobel (2004).

Legend for Table 2:

Market values and cash are in million CHF. Market values are calculated two days before the announcement dates. The fractions are either the fraction of outstanding shares sought as mentioned in the news or calculated by dividing the nominal amount paid out by the market value. Tobin's Q is calculated as the ratio of the sum of the daily three month average market value of equity and the book value of debt and the sum of the book values of debt and equity. Adjusted cash is calculated by dividing cash holdings by market value. The undervaluation proxy is calculated as the cumulative abnormal return over a four month window ending 11 days before the announcement date. All balance sheet data are only available year end. Not all data is available for all observations, thus the number of observations is not accurate for all different categories.

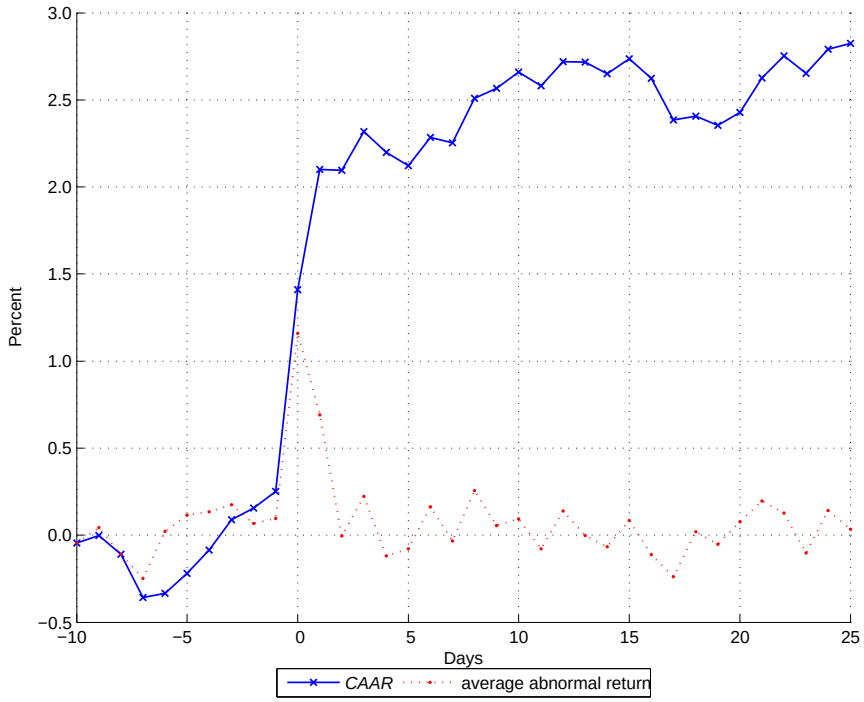

Figure 1: Average abnormal returns and cumulative average abnormal returns: total sample

Table 2: Capital reductions: characteristics sorted according to different methods

Panel A:		**Market value (m CHF)**			
	Obs.	Average	Median	Max	Min
Total sample	183	8,840	977	200,580	28
Share repurchases	71	12,586	2,269	200,580	82
Repayments of nominal value	105	5,835	606	113,159	28
Both	7	15,925	709	96,723	182
Share repurchases by method					
Open market	2	3,059	3,059	3,197	2,921
2^{nd} trading line	27	27,083	3,471	200,580	234
Put	10	5,884	1,751	32,399	317
Fixed price	17	4,356	1,767	40,128	82
Dutch auction	4	1,328	1,167	2,551	429
Negotiated	7	2,028	1,106	5,860	176
N.A.	4				
Panel B:		**Fraction repurchased or repaid**			
		Average	Median	Max	Min
Total sample		5.53%	3.18%	36.40%	0.16%
Share repurchases		8.59%	6.70%	36.40%	1.18%
Repayments of nominal value		3.52%	2.08%	33.65%	0.16%
Both		N.A	N.A.	N.A.	N.A.
Share repurchases by method					
Open market		6.82%	6.82%	8.33%	5.30%
2^{nd} trading line		6.46%	5.50%	16.35%	1.18%
Put		7.95%	7.00%	20.00%	2.50%
Fixed price		9.91%	10.00%	29.70%	2.50%
Dutch auction		7.02%	6.54%	10.00%	5.00%
Negotiated		13.93%	6.30%	36.40%	2.10%
Panel C: Additional Characteristics		**Tobin's Q**	**Cash**	**Adj. Cash**	**Underval.**
		Median	Median	Median	Median
Total sample		1.429	208	18.34%	-0.02%
Share repurchases		1.694	296	17.43%	-3.38%
Repayments of nominal value		1.277	146	18.80%	0.59%
Both		1.225	238	15.51%	-6.27%
Share repurchases by method					
Open market		1.717	139	4.60%	-0.40%
2^{nd} trading line		1.651	375	10.23%	-4.47%
Put		1.876	399	20.61%	-1.74%
Fixed price		1.694	391	22.29%	2.54%
Dutch auction		2.418	103	17.84%	-6.40%
Negotiated		1.421	148	7.66%	0.48%

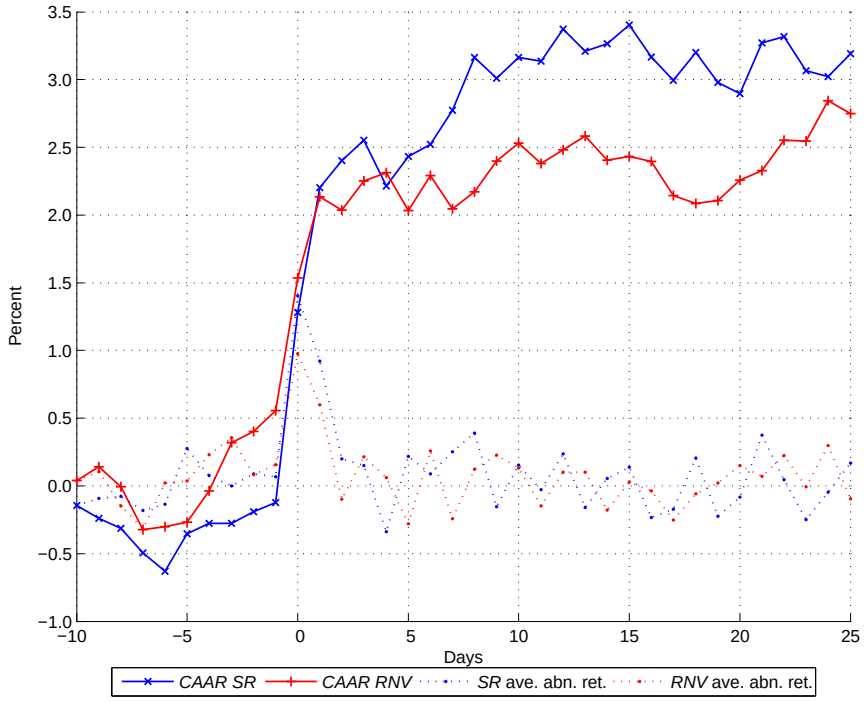

Figure 2: Average abnormal returns and cumulative average abnormal returns: SR and RNV

Table 3: $CAAR$ for different capital reduction methods

Panel A: Capital reductions by method		[0, 1]-window			[0, 10]-window		
	Obs.	$CAAR$	J_1	J_2	$CAAR$	J_1	J_2
Total sample	183	1.85%	9.72	10.86	2.41%	5.30	5.54
Share repurchases	71	2.33%	8.45	9.11	3.29%	4.99	5.40
Repayments of nominal value	105	1.58%	5.86	6.28	1.97%	3.08	2.89
Both	7	1.12%	1.34	2.19	0.00%	0.00	-0.07
Panel B: Share repurchases by method							
Open market	2	0.73%	0.71	0.74	2.83%	1.15	1.19
2^{nd} trading line	27	2.05%	4.28	5.10	5.13%	4.48	4.79
Put	10	4.03%	6.24	5.31	4.40%	2.85	2.53
Fixed price	17	2.62%	5.22	5.76	1.22%	1.02	1.42
Dutch auction	4	-0.75%	-0.88	-1.14	1.17%	0.58	0.54
Negotiated	7	1.20%	1.44	2.14	1.25%	0.63	0.46
Panel C: Repayments of nominal value sorted							
Dividend substitution	48	1.12%	2.65	2.30	1.47%	1.47	0.65
Dividend increase	17	2.42%	3.72	3.17	4.27%	2.76	2.74
Stand-alone	40	1.71%	4.21	5.51	1.43%	1.48	2.04
Other news	26	0.57%	1.06	1.88	0.68%	0.53	0.75
Dividend sub. excl. other news	40	1.24%	2.68	2.34	1.71%	1.54	0.73

The table contains the cumulative average abnormal returns for different subsamples. The test statistics are calculated as described in section 4. The subsamples are defined in section 2 (share repurchase methods) and section 5 (repayments of nominal value).

Table 4: Differences in means between $CAAR$ of different subsamples

	$[0,1]$-window		$[0,10]$-window		
	$CAAR$ difference	t-statistic	$CAAR$ difference	t-statistic	d.f.
$SR - RNV$	0.75%	1.90	1.31%	1.39	174
Put $-$ 2^{nd} Line	1.98%	2.30	-0.73%	-0.36	35
$DI - DS$	1.30%	1.64	1.30%	1.48	64
$DI - SA$	0.71%	0.97	2.84%	1.44	55
$SA - DS$	0.59%	1.01	-0.04%	-0.03	86

Differences are expressed as percentage points. SR means share repurchase, RNV means repayment of nominal value, DI stands for dividend increase, DS for dividend substitution, SA for stand-alone. d.f. means degrees of freedom. The subsamples are the same as in table 3.

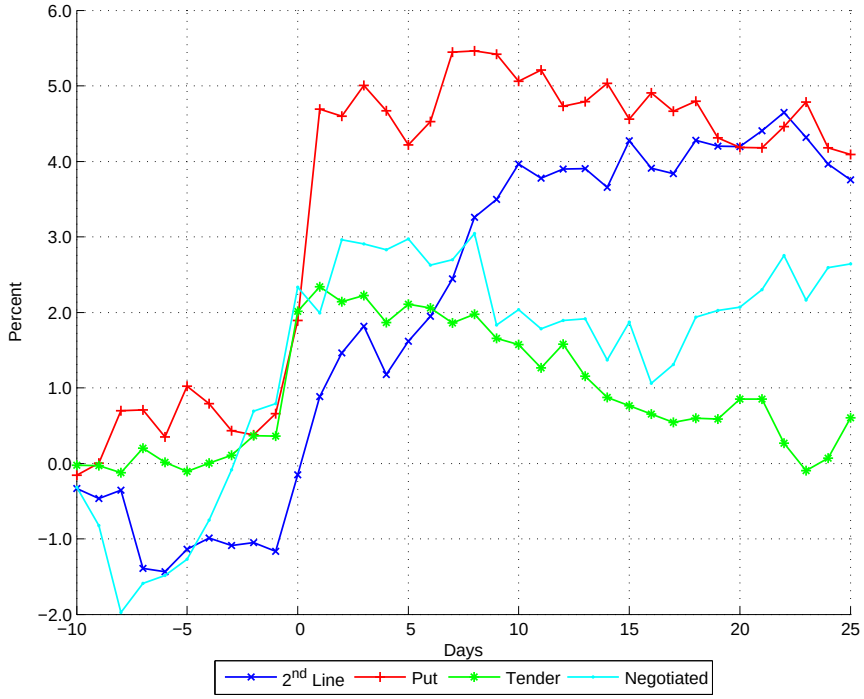

Figure 3: Cumulative average abnormal returns: SR sorted according to the repurchase method

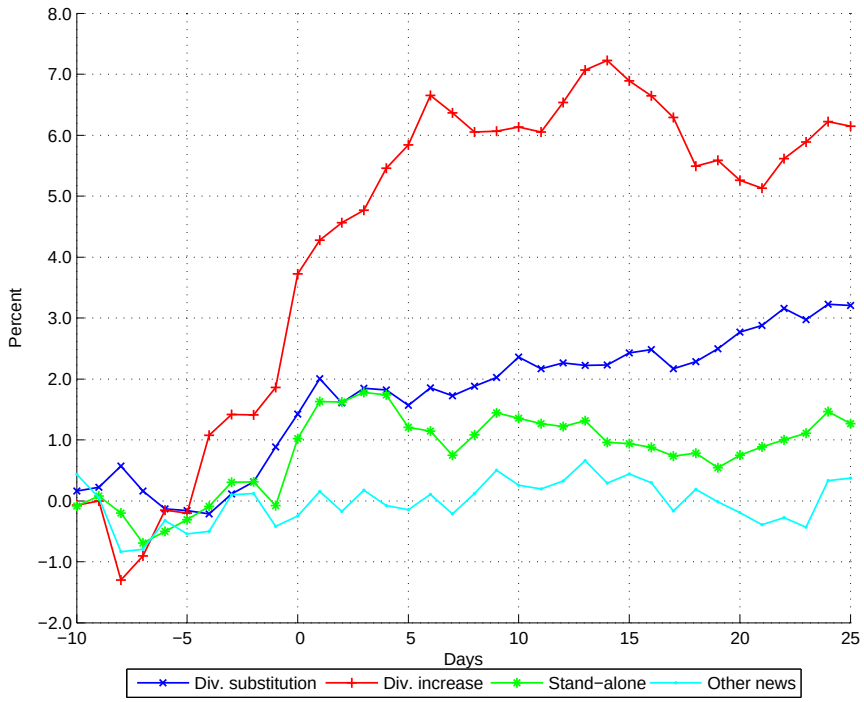

Figure 4: Cumulative average abnormal returns: RNV sorted according to various criteria

Table 5: $CAAR$ for the DS subsample: taking expected tax gains into account

		[0, 1]-window		[0, 10]-window	
	Obs.	$CAAR$	J_1	$CAAR$	J_1
Dividend substitution	48	1.1159%	2.650	1.4750%	1.467
DS average tax rate	48	1.1101%	2.636	1.4691%	1.461
DS maximal tax rate	48	1.1083%	2.632	1.4673%	1.459

The average marginal tax rate is 25%, the maximum rate 33%. The cumulative abnormal returns are calculated by estimating the usual CAR and then subtracting the expected excess return. The expected return is the fraction of market value paid out multiplied by the tax rate.

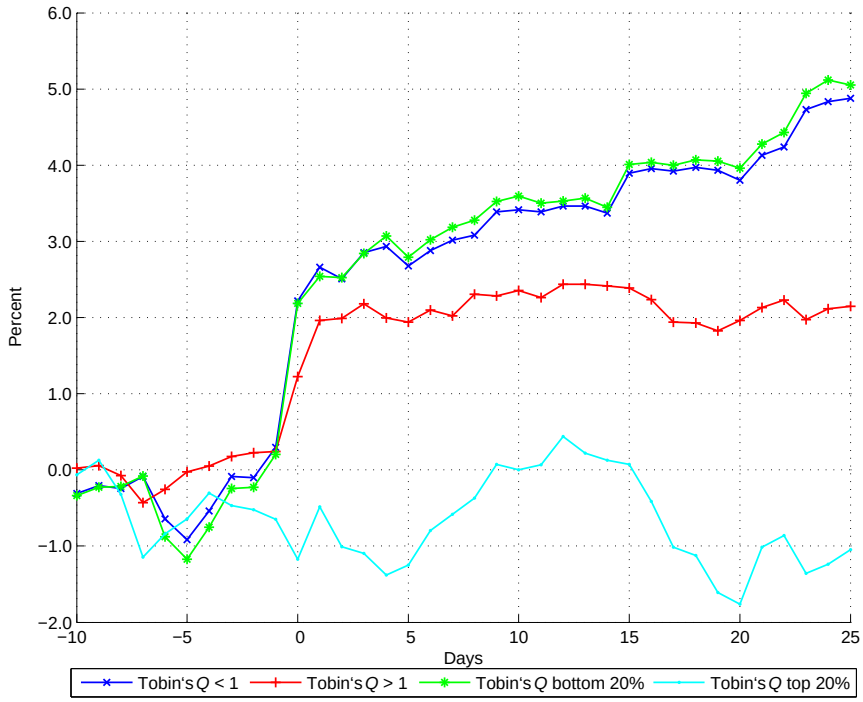

Figure 5: Cumulative average abnormal returns: total sample sorted according to Tobin's Q

Table 6: $CAAR$ for subsamples sorted according to Tobin's Q

Panel A: Total sample		[0, 1]-window			[0, 10]-window		
	Obs.	$CAAR$	J_1	J_2	$CAAR$	J_1	J_2
Total sample	183	1.85%	9.72	10.86	2.41%	5.30	5.54
$TQB1$	37	2.37%	5.42	5.96	3.12%	3.00	3.49
$TQA1$	143	1.72%	8.06	8.99	2.11%	4.14	4.15
$TQ20$	35	2.34%	5.13	5.60	3.39%	3.12	3.72
$TQ80$	35	0.16%	0.34	-0.10	0.65%	0.58	0.09
Panel B: Share repurchases							
SR	71	2.33%	8.45	9.11	3.29%	4.99	5.40
$TQB1SR$	9	3.20%	3.74	5.24	4.08%	2.01	2.77
$TQA1SR$	62	2.20%	7.60	7.75	3.17%	4.57	4.72
$TQ20SR$	14	2.74%	4.42	5.64	4.45%	3.01	3.97
$TQ80SR$	14	1.38%	1.82	2.31	1.34%	0.73	1.12
Panel C: Repayments of nominal value							
RNV	105 1.58%	5.86	6.28	1.97%	3.08	2.89	
$TQB1RNV$	26 2.04%	3.80	3.42	3.16%	2.46	2.69	
$TQA1RNV$	76 1.41%	4.46	5.02	1.34%	1.77	1.36	
$TQ20RNV$	20 2.15%	3.70	3.29	2.64%	1.90	1.90	
$TQ80RNV$	20 -0.41%	-0.61	-1.38	-0.82%	-0.52	-1.75	

The table contains the cumulative average abnormal returns for different subsamples. The test statistics are calculated as described in section 4. $TQB1$ contains all firms with Q-values below, $TQA1$, those with Q-values above one. The firms with the bottom 20% of the Q-values are in $TQ20$, those with the top 20% in $TQ80$. SR means share repurchase, RNV means repayment of nominal value. $CAAR$ stands for cumulative average abnormal return.

Table 7: Differences in means between $CAAR$ of different subsamples

	$[0,1]$-window		$[0,10]$-window		
	$CAAR$ difference	t-statistic	$CAAR$ difference	t-statistic	d.f.
$TQB1 - TQA1$	0.65%	1.37	1.01%	0.90	178
$TQ20 - TQ80$	2.18%	3.37	2.75%	1.78	68
$TQB1SR - TQA1SR$	1.00%	1.23	0.91%	0.47	69
$TQ20SR - TQ80SR$	1.36%	1.45	3.11%	1.38	26
$TQB1RNV - TQA1RNV$	0.63%	1.01	1.82%	1.23	100
$TQ20RNV - TQ80RNV$	2.55%	2.95	3.46%	1.68	38

Differences are expressed as percentage points. $TQB1$ contains all firms with Q-values below, $TQA1$, those with Q-values above one. The firms with the bottom 20% of the Q-values are in $TQ20$, those with the top 20% in $TQ80$. SR means share repurchase, RNV means repayment of nominal value. $CAAR$ stands for cumulative average abnormal return. d.f. means degrees of freedom. The subsamples are the same as in table 66.

Table 8: Cross-sectional regressions for the whole sample

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	7.4432	7.5002	7.8831	8.0022	8.1153
	5.48***	5.33***	5.02***	4.98***	4.97***
MV	-0.3564	-0.3744	-0.3756	-0.3633	-0.3955
	−2.12**	−2.13**	−2.00**	−1.90*	−1.88*
VOL	0.8923	0.8062	0.8179	0.7763	0.6721
	3.28***	2.72***	2.97***	2.71***	1.64
TQ		-0.1016			
		-0.65			
D_TQ20			-0.9577	-1.1158	-1.0997
			-1.19	-1.35	-1.30
D_TQ80			-1.7343	-1.6837	-1.8169
			−2.25**	−2.15**	−2.16**
ADJ_CASH				0.1767	0.1903
				0.65	0.68
D_RNV					-0.3306
					-0.36
UNDERVAL					-0.0046
					-0.25
Observations	174	171	171	169	169
R^2	0.1046	0.1090	0.1370	0.1362	0.1374
Adj. R^2	0.0941	0.0930	0.1162	0.1097	0.0999

The dependent variable is the two-day CAR. t-statistics are below the coefficient estimates. $*$ significant at the 10% level, $**$ significant at the 5% level, $***$ significant at the 1% level. MV is the log market value, VOL is the log of the fraction, TQ is Tobin's Q, D_TQ20 is a dummy variable that takes the value one for all firms in the top quintile and D_TQ80 is a dummy that takes the value one for firms in the bottom quintile. ADJ_CASH is the adjusted cash, D_RNV is a dummy variable that takes the value one for repayments of nominal value and UNDERVAL is the undervaluation proxy. Market values are calculated two days before the announcement dates. The fractions are either the fraction of outstanding shares sought as mentioned in the news or calculated by dividing the nominal amount paid out by the market value. Tobin's Q is calculated as the ratio of the sum of the daily three month average market value of equity and the book value of debt and the sum of the book values of debt and equity. Adjusted cash is calculated by dividing cash holdings by market value. The undervaluation proxy is calculated as the cumulative abnormal return over a four month window ending 11 days before the announcement date.

Table 9: Cross-sectional regressions for share repurchases

Variable	Model 1	Model 2	Model 3	Model 4	Model 6
Constant	8.2866	8.2888	8.9155	8.9993	9.2888
	3.56***	3.53***	3.45***	3.41***	3.48***
MV	-0.4231	-0.4158	-0.5095	-0.4945	-0.5531
	-1.15	-1.11	-1.38	-1.30	-1.42
VOL	1.0319	0.9900	0.7181	0.6906	0.6560
	1.25	1.14	0.84	0.79	0.75
TQ		-0.0882			
		-0.16			
D_TQ20			-1.4687	-1.6460	-1.6288
			-0.91	-0.89	-0.88
D_TQ80			-2.1096	-2.1371	-2.0864
			-1.95^{*}	-1.95^{*}	-1.89^{*}
ADJ_CASH				0.1331	0.1379
				0.20	0.21
UNDERVAL					-0.0266
					-0.77
Observations	69	69	69	69	69
R^2	0.1040	0.1044	0.1595	0.1601	0.1680
Adj. R^2	0.0769	0.0630	0.1070	0.0934	0.0875

The dependent variable is the two-day CAR. t-statistics are below the coefficient estimates. $*$ significant at the 10% level, $**$ significant at the 5% level, $***$ significant at the 1% level. MV is the log market value, VOL is the log of the fraction, TQ is Tobin's Q, D_TQ20 is a dummy variable that takes the value one for all firms in the top quintile and D_TQ80 is a dummy that takes the value one for firms in the bottom quintile. ADJ_CASH is the adjusted cash, and UNDERVAL is the undervaluation proxy. Market values are calculated two days before the announcement dates. The fractions are either the fraction of outstanding shares sought as mentioned in the news or calculated by dividing the nominal amount paid out by the market value. Tobin's Q is calculated as the ratio of the sum of the daily three month average market value of equity and the book value of debt and the sum of the book values of debt and equity. Adjusted cash is calculated by dividing cash holdings by market value. The undervaluation proxy is calculated as the cumulative abnormal return over a four month window ending 11 days before the announcement date.

Table 10: Cross-sectional regressions for repayments of nominal value

Variable	Model 1	Model 2	Model 3	Model 4	Model 7
Constant	7.0362	7.0167	7.2577	7.4261	7.3576
	4.12***	3.86***	3.41***	3.30***	3.23***
MV	-0.2787	-0.3280	-0.3473	-0.3361	-0.3087
	-1.18	-1.31	-1.34	-1.28	-1.14
VOL	0.9132	0.7594	0.7488	0.6956	0.6761
	2.29**	1.65	1.68*	1.45	1.39
TQ		-0.1084			
		-0.62			
D_TQ20			-0.6988	-0.8265	-0.8917
			-0.73	-0.84	-0.88
D_TQ80			-1.4737	-1.2373	-1.1374
			-1.14	-0.90	-0.79
ADJ_CASH				0.2429	0.2368
				0.76	0.71
UNDERVAL					0.0037
					0.15
D_ON					-0.7939
					-0.85
Observations	105	102	102	100	100
R^2	0.0991	0.1057	0.1177	0.1160	0.1238
Adj. R^2	0.0814	0.0783	0.0814	0.0690	0.0572

The dependent variable is the two-day CAR. t-statistics are below the coefficient estimates. $*$ significant at the 10% level, $**$ significant at the 5% level, $***$ significant at the 1% level. MV is the log market value, VOL is the log of the fraction, TQ is Tobin's Q, D_TQ20 is a dummy variable that takes the value one for all firms in the top quintile and D_TQ80 is a dummy that takes the value one for firms in the bottom quintile. ADJ_CASH is the adjusted cash, UNDERVAL is the undervaluation proxy and D_ON is a dummy variable that takes the value one for all observations that are in the subsample 'other news' as defined in section 5. Market values are calculated two days before the announcement dates. The fractions are either the fraction of outstanding shares sought as mentioned in the news or calculated by dividing the nominal amount paid out by the market value. Tobin's Q is calculated as the ratio of the sum of the daily three month average market value of equity and the book value of debt and the sum of the book values of debt and equity. Adjusted cash is calculated by dividing cash holdings by market value. The undervaluation proxy is calculated as the cumulative abnormal return over a four month window ending 11 days before the announcement date.