Why Do Repurchases Affect Share Prices?

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1. Introduction

In the 1990s the level of corporate repurchases increased markedly while the level of dividend payments declined. This trend occurred not only in the United States (Fama and French, 2001; Julio and Ikenberry, 2004) but also in the United Kingdom (Ferris et al., 2006). Although there have been many empirical studies (beginning with Vermaelen, 1981), it has proved difficult to explain precisely why repurchases have an impact on share prices. The stylised facts are that when a company makes a repurchase announcement for the first time: (i) there is an immediate jump in the share price of around 3%[1]; (ii) the share price shows a strong upward trend (relative to other companies) over the next three to four years of 2-7% per annum[2]; and (iii) these effects are larger for companies which initially trade at low market-to-book ratios.[3]

In this paper we examine what happens to the prices and the operating performance of closed-end-fund companies which announce repurchases. Because daily prices are available for the fund and the underlying assets held by the fund (the net-asset value), such funds can provide more information for testing alternative theories of repurchases

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[1] See Ikenberry et al., 1995, for US evidence; Ikenberry, Lakonishok and Vermaelen, 2000, for Canadian evidence; and Rau and Vermaelen, 2002, for UK evidence.

[2] Estimated at 2.4% in the US by Ikenberry and Vermaelen, 1995 and a similar magnitude by Kadiyala and Rau, 2004; as high as 7% per annum in Canada, by Ikenberry, Lakonishok, and Vermaelen, 2000; but not significantly different from zero in the UK, by Rau and Vermaelen, 2002.

[3] See, for example, Peyer and Vermaelen (2005).

than is possible with conventional companies. More specifically, the data allow us to compute the actual profits realised when the repurchases are executed. Our sample, comprising 140 UK-listed closed-end funds that make initial repurchase announcements in the period November 1996-October 2004, enables us to examine what happens to prices and net-asset values at three distinct times: when the repurchases are announced; when the actual repurchases are made; and over the next four years.

In the academic literature, the four reasons that are typically put forward to explain why announcing a programme of repurchases might increase a company's share price have no, or limited, applicability to closed-end funds.[4] First, in the wider finance literature on signalling, managers are deemed to be better informed than the shareholders about the company's value and they reveal that the shares are undervalued by making repurchases. However, in relation to closed-end funds, the company's value is as clear to shareholders as it is to managers − it is public information − so this simple signalling story cannot hold. The second argument, that a repurchase of shares increases the proportion of debt in the capital structure thereby raising leverage towards an optimal level, is also weak in relation to closed-end funds because funds tend to have very little debt, partly because they cannot benefit from any tax shield given their special tax status.[5] The third argument, that a repurchase distributes surplus cash which, if retained by the company, would give managers too much discretion, is not applicable to closed-end funds because the funds are not allowed (for legal reasons) to hold excess cash. Consequently, when a fund wants to repurchase its shares, it typically sells part of its portfolio rather than using

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[4] See Ikenberry, Lakonishok, and Vermaelen (2000) for the first three of these arguments.

[5] In the UK there is a special class of split-capital funds which are highly geared. We exclude them from this study.

surplus cash balances. The fourth argument is that once a company starts to repurchase its own shares, liquidity improves which reduces the cost of capital and raises the share price (see Cook, Krigman, and Leach, 2004, and Eberhart and Siddique, 2004). A problem with this theory is that the effect is likely to be temporary unless repurchases are continued over a long time. In addition, a liquidity effect is more plausible for companies in the US, where repurchased shares can later be re-issued so that a company is able to provide liquidity on a continuing basis. In the UK, until recently (and encompassing the period of our study), shares which were repurchased had to be cancelled. Nevertheless, we test this liquidity theory.

There are, however, two other theories to be considered. The first theory is that share prices and net-asset-values per share are both enhanced by the profits made from repurchasing the fund-shares at a market price which stands at a discount to the market value of the underlying assets. This is a simple arbitrage argument and is similar to the 'market-timing' theory of repurchases for conventional companies. However, in contrast to conventional companies, this arbitrage is risk-free for closed-end funds. Our results confirm that prices and net-asset values do indeed behave in this way but only in the short-term. When the repurchase programme is announced, the fund price increases and the discount narrows. The discount widens again when the repurchase is made and the profit on the repurchase is realised, and reflected in the net-asset-value (operating) performance. However, the price response at the time of the initial announcement indicates that the market views the announcement as a one-off event despite the fact that, for all the funds in our sample, the repurchase announcement is included on the agenda of all subsequent Annual General Meetings. Furthermore, over the four years following the initial announcement, the price outperformance is around ten times the annual profits

from repurchases. The arbitrage theory is therefore not sufficient, by itself, to explain observed price behaviour.

The second theory which we consider is that repurchases are a signal to shareholders that the character of the company has changed. Grullon and Michaely (2004), in a study of conventional companies, suggest that the repurchase announcement signals a reduction in future growth opportunities. Shareholders, recognising this as a signal that the firm is becoming less risky, adjust their required rate of return downwards. As a result, the market-to-book of the company rises but the operating performance (e.g. return on equity) remains unchanged. A recent test of this theory by Lie (2005) finds that relative operating performance improves in the 2-year period following a repurchase announcement and that this increase is conditional upon the firm executing the repurchases. In other words, an actual repurchase is necessary for better operating performance to occur; the repurchase announcement, by itself, does not suffice. Because operating performance improves for companies which execute repurchases, Lie's findings imply that the change in the character of the company cannot simply be a reduction in its risk but must be associated with an increase in earnings.

Our results on long-term prices and performance provide more support for Lie (2005) than they do for Grullon and Michaely (2004). Repurchase-announcing funds show not only price-outperformance of 4% per annum but also outperform in terms of portfolio value by 3% per annum. Operating performance therefore clearly improves following the repurchase announcement and this is the most surprising result of our study. It lends strong support to the theory that the character of the company has changed (as in Grullon and Michaely) but it indicates that the change cannot just be a reduction in risk. What

distinguishes the funds which go ahead and execute repurchases (from those funds that announce but do not execute) is not their post-announcement performance but their performance in the four years prior to the announcement. Funds that execute repurchases are those funds that perform badly in the four years prior to the repurchase announcement; these funds then experience a large rebound in operating performance after the repurchases have been made.

The remaining puzzle is why a fund's operating performance should be affected so strongly by the announcement and execution of repurchases? In the final section of the paper we propose that governance is the missing factor. We argue that a repurchase signals an increase in the director-oversight of the fund manager. The signal becomes credible only if the repurchases are executed because repurchases reduce the size of the fund and the manager's fees are proportional to fund size. We call this the 'governance theory of repurchases' and some initial evidence on turnover of directors is presented to support it.

In summary, our results suggest that different forces are at work in determining the effects of repurchases in the short-term and in the long-term. In the short term, the share price jumps a little on the repurchase announcement because of anticipated arbitrage profits. In the long term, there is a real impact on performance for fund companies which execute repurchases because directors have signalled that they are determined to improve the management of the company.

The paper is written as follows. In the second section (which follows this introduction) we develop our hypotheses about the potential impact of repurchases for closed-end-

fund companies. In the third section we discuss the data used. In section four we give the empirical results for the short-term and in section five we give the results for the long-term. Finally, section six draws together the conclusions and implications of this study.

2. Theory: what effects can be expected from repurchases?

The aim of this section is to develop two alternative theories about the market reaction to repurchase announcements. One theory is based on arbitrage profits, considering what happens either if there is just one repurchase announcement (section 2.1) or if one announcement indicates that a series of annual announcements will follow (section 2.2). The second theory considers what happens if the first repurchase announcement signals that the character of the company has changed (section 2.3).

2.1. Arbitrage theory: when one repurchase announcement does not signal a continuing series

When a closed-end fund is trading at a discount and announces a repurchase programme, it is clear to both managers and investors that an arbitrage profit will be made. The company can sell the assets at a higher price than has to be paid for the shares. If there is an efficient market, investors will anticipate the profit, raising the share price at the time of the announcement and causing the discount to close-up (i.e. market-to-book rises). When the actual repurchases are made, the net-asset value per share will rise due to the profits which have now been realised, but the share price will not change and so the rise

in the net-asset value will cause the discount to widen-out again (i.e. market-to-book falls). This sequence is shown with an example in Table 1 and plotted in Figure 1.[6]

A fund starts (see Table 1, row 1) with 10,000 shares and a portfolio of assets worth $100,000, so the net-asset-value per share is $10. Assuming that there is a -10% discount, the price per share is $9. The directors now announce a repurchase of 1,000 shares (i.e. 10% of the fund), which will be financed by selling assets. The repurchases drive-up the share price, as holders need to be paid a price higher than the current $9. The fund can afford to pay up to a maximum of $10 per share (the net-asset-value per share). The table assumes that the 1,000 shares are repurchased at a share price of $9.091, costing a total of $9091 and leaving a new total value for the assets of $90,909. Investors anticipate this increase in the value of the assets and drive-up the price to $9.091 immediately (Table 1, row 2). When the actual repurchases are executed (Table 1, row 3), the net-asset-value per share rises to $10.101 because the fund makes a profit of ($10-9.091) on 1,000 shares, i.e. $909, which is equal to ($909/9000 =) $0.101 per remaining share.

In this example it is assumed that the discount widens back to the original -10% after the repurchases actually are made, because the same managers remain in place and nothing else about the company has changed.[7] This is a convenient assumption because it allows us to derive the expected change in share price at the time of the announcement. The

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[6] This particular example is adapted from Porter et al. (1999).

[7] Such an assumption is only consistent with a small repurchase, because, in the limit, a repurchase might be made for the entire fund. That would be an 'open-ending' and the discount would disappear completely.

intuition for this result is that the profits from repurchases contribute to the increase in the total value of the assets and the value of the shares is at a fixed discount to the total value of the assets. Under the assumption of a constant long-term discount, the jump in the share price to \$9.091 (in Table 1 and Figure 1) therefore depends only on two variables: the proportion of shares repurchased and the initial discount.

Let NAV denote net-asset value per share, S denote number of shares, R denote the proportion of shares repurchased, P denote share price, and D denote discount. The subscript 'a' denotes the period after the repurchase and subscript 'b' denotes the period before the repurchase. Following Porter et al. (with some small modifications of terms – in particular, we define a discount to be negative), we note that the net-asset value of the portfolio after the repurchase is equal to its value before, less the cost of the repurchase:

$$NAV_a \, S_a = [(NAV_b \, S_b) - (S_b \, R \, P_a)] \tag{1}$$

Expressing this equation in terms of the discount after the repurchase, D_a, (which equals the value of the remaining shares minus the value of the portfolio, divided by value of the portfolio) we have:

$$D_a = \frac{\{S_b(1-R)P_a\} - [(NAV_b \, S_b) - (S_b \, R \, P_a)]}{[(NAV_b \, S_b) - (S_b \, R \, P_a)]} \tag{2}$$

Re-arranging this equation in terms of the share price at which repurchases are made (and which is assumed to be the share price after that event) we have:

$$P_a = \frac{NAV_b(1+D_a)}{1+(D_a \, R)}$$

$$\tag{3}$$

Equation (3) indicates that the price (P_a) after the repurchases (and at which repurchases are made) has a fixed relationship with the net-asset value per share before the repurchase (NAV_b), the proportion of the shares repurchased (R), and the discount after the repurchase (D_a). Checking this with the example of Table 1 in which the discount is assumed unchanged, we have P_a = 10(1-0.1)/{1+(-0.1)(0.1)} = \$9.091, as given in the bottom right-hand cell of Table 1.

Having assumed that the discount is unchanged by the programme of repurchases (D_a = D_b = constant), we can then re-write equation (3) in terms of the percentage change in price to be expected, which is:

$$E\left[\frac{P_a - P_b}{P_b}\right] = \left[\frac{1}{1 + (D_b)(R)} - 1\right] \qquad (4)$$

and we know by definition that

$$D_b = \left[\frac{P_b}{NAV_b} - 1\right].$$

Re-arranging equation (4) we then have

$$E\left[\frac{P_a - P_b}{NAV_b}\right] = \left[\frac{1}{1 + (D_b)(R)} - 1\right]\left[D_b - 1\right] \qquad (5)$$

The left-hand side of Equation (5) is the expected temporary change in the discount if the market is informationally efficient, after the announcement has been made and before the repurchases occur. It depends directly on only two variables: the size of the initial discount (D_b) and the proportion of the shares which are repurchased (R). We will use equations (4) and (5) in some of our empirical tests.

2.2. Arbitrage theory: when one repurchase announcement signals a continuing sequence of profitable repurchases

The first announcement of a repurchase programme may be a surprise to the shareholders, so it may elicit an 'event response'. However, in the U.K. subsequent repurchase programmes for closed-end funds are routinely agreed at shareholders' annual meetings.[8] It follows that the initial announcement is a signal, with a very high probability, that there will be a whole series of repurchases over many years. If markets are perfect, the result of the first announcement should be an increase in the share price to the net-asset value per share in one single step, except possibly for some risk-free discounting because the programme is spread-out over several years. The credible threat of a series of 'options to repurchase' (Ikenberry and Vermaelen, 1996) will make any actual repurchases unnecessary and remove most of the discount at once.

In the real world, however, arbitrage is likely to be imperfect for a variety of well-known reasons.[9] This suggests that there will be a jump in the price at the time of the first

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[8] In our sample, every fund that announces that it will seek permission to make repurchases in one year makes a similar announcement in every subsequent year.

[9] These include: replication risk; transactions costs; model risk; and an unknown horizon for the arbitrage. See Shleifer (2000).

announcement, to be followed by a trend until some target for the market-to-book, chosen by the directors, has been reached. For example, the target might be a market-to-book of 0.95, or an equivalent discount of -5%. Although the price might show a smooth trajectory, the net-asset value will rise in a series of steps at the times that the actual repurchases are executed. Figure 2 illustrates what may happen, starting from a discount of -20%. The price rises smoothly, the net-asset value takes steps, and the discount (which is the one relative to the other) shows a 'saw-tooth' effect. In the empirical part of the paper, we will test whether the jump in price at the time of announcement is more than can be explained by one round of anticipated repurchases and whether this 'saw-tooth' effect is present in the behaviour of the discount.

2.3. Signalling-of-company-character theory

Thus far we have assumed that changes in prices and net-asset values are driven by profits from repurchases (either actual or expected). Another possibility is that the first announcement indicates a change in the character of the company (Grullon and Michaely, 2004). In our version of this theory, the change is that the directors have asserted their independence from the managers, signalling an improvement in corporate governance which is likely to improve the fund's performance. It is customary for the fund-management company to organise the IPO of a closed-end fund and it also assembles the board of directors. The directors are therefore often beholden to the managers and may sit on many boards of funds within a single fund family (see Del Guercio, Dann and Partch, 2003; Gemmill and Thomas, 2006). The management fee is related to the size of fund, so a repurchase which reduces that size has a direct impact on the income of the fund-management company. Announcing a repurchase is therefore a signal that the distribution of power between the directors and the managers may have

shifted. However, shareholders need to be convinced that management has improved, so the first announcement leads to a jump in share price which is no larger than would be expected from one round of arbitrage profits. The signal becomes credible if repurchases are actually made (when profitable).

Figure 3 shows two alternative paths for price and net-asset value under this governance theory of repurchases. The upper two lines show what happens for funds which go ahead and execute repurchases, leading to drifts in price and net-asset value which exceed those given from the effects of arbitrage profits in Figure 2. The lower two lines show what happens to funds which announce repurchases but do not execute them.   The price jumps on the announcement, but it falls back thereafter and there is no long-term impact on the net-asset value or on the discount.[10]

2.4. Summary of the four hypotheses to be tested

We therefore have four hypotheses about the potential behaviour which may follow a repurchase announcement, two relating to the arbitrage theory and two relating to signalling-of-company-character theory. The first hypothesis is that directors time the announcement of a repurchase such that an arbitrage profit is made in the short-term, but there is no long-term effect on the fund performance or on the market-to-book (discount).

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[10] Massa, Rehman and Vermaelen (2005) denote such companies as 'mimickers'. However, in our context, some companies which announce repurchases may not execute them because their share price has already risen for other reasons. Such companies could not be accused of pretending that they were going to make repurchases, because the repurchases are no longer needed.

The second hypothesis is that shareholders anticipate that the initial announcement foretells a series of profitable repurchases over many years, so that the share price jumps on announcement by more than can be explained by one year's expected profit. After that, the share price and net-asset-value per share drift up slowly over several years, as the repurchase profits are realised on a continuing basis.

The third hypothesis is that the announcement of repurchases signals a change in the character of the company, leading to a much larger impact on prices and operating performance (net-asset value) than can be explained by any potential profits from repurchases.

The fourth hypothesis is that companies which announce repurchases but do not execute them show a jump in price at the time of the announcement but do not show any long-term gains in price or operating performance.

3. Data and methodology

The sample comprises 140 UK-traded equity closed-end funds which make repurchase announcements in the period November 1996 to October 2004.[11] The time pattern of the

[11] Although legislation has permitted UK companies to repurchase their equity since 1980, most closed-end funds did not use this power until 1998. Prior to 1998, companies, when they repurchased, were required to pay Advance Corporation Tax (equivalent to 25%) of the difference between the repurchase price and the original issue price of the shares. This ACT could subsequently be set-off against the company's Mainstream Corporation Tax assessment. However, although closed-end funds were required to pay ACT on the repurchase, they are not liable to Corporation Tax and therefore the ACT represented a deadweight cost of the repurchase. In 1998, ACT was abolished.

140 repurchase announcements is 2 funds in 1996, 4 in 1997, 53 in 1998, 58 in 1999, and 23 between 2000 and 2004. At the time of the announcement the average fund has a portfolio worth £195 million (median £82 million, range £3 million to £2088 million) and trades at a discount of -17% to net-asset-value (median -17%, range -40% to +10%). Data relating to the repurchase announcements are extracted from the Regulatory News Service (RNS) of the London Stock Exchange. The RNS provides the first notification of the fund's intention to gain shareholders' permission to repurchase the equity. The RNS, which we access through the Perfect Information database, gives the date of the required Extraordinary General Meeting and the maximum percentage of equity to be repurchased. In all cases, the motion seeking permission to repurchase is approved. Most of the funds (132 out of 140) gain permission to repurchase, in the following financial year, 14.99% of the equity, which is the maximum allowed under current listing rules in London. Data on the actual daily repurchases made by the individual funds are obtained from JPMorgan Cazenove Ltd. Daily data on fund-prices and net-asset values are obtained from Datastream.

In order to examine the price performance around the date of the repurchase announcement, we compute the abnormal fund-price movements as the difference between the actual fund-price return and the expected return, using the standard market model (Equation (6)). In the special case of closed-end funds, the 'market' return is the net-asset-value return on the portfolio actually held by the fund, rather than the return on a benchmark index. To estimate the market model, we use 52 weeks of data which finish 20 days prior to the announcement. Abnormal fund-price returns are cumulated over the period from day -10 to day +20 relative to the announcement.

$$R_p = a + b\ NAV_p + error \tag{6}$$

To investigate the impact of the actual repurchases executed in the market in a particular year, we compare the average discount before the start of that year's repurchase programme with the average discount after the date of the last repurchase for that year. We do this by comparing the discount for each fund averaged over a period of 20 days prior to the start of the repurchase programme with the fund discount averaged over a period of 20 days following the completion of the repurchase programme for that year. We correct for market-wide changes in the discount which occur over this period.

For the long-term analysis, we investigate fund-price and net-asset-value performance by running a Fama/French 3-factor regression over periods up to 48 months from the date of the initial repurchase announcement.   The model is:

$$R_p = a + b\ Benchmark_p + c\ SMB + d\ HML + error \tag{7}$$

where $Benchmark_p$ is the return on the benchmark for this fund, SMB is the return on small shares relative to large shares, and HML is the return on high book-to-market companies relative to low book-to-market companies. The long-term regressions are conducted both on individual funds and as a panel with fixed effects (i.e. with a dummy variable to identify each fund).

There can be a bias in long-term event studies due to the clustering of events in calendar time (Fama, 1988; Mitchell and Stafford, 2000). We therefore also conduct a calendar-time portfolio approach. This requires the formation of a single portfolio on which a

time-series regression of the form given in (7) is carried out. Funds enter the portfolio for a given month if the event is sufficiently recent in their case. For example, the portfolio might include all funds which announced repurchases within the last two years.

4. Results over the short term

4.1. Performance around the time of the first repurchase announcement

The plot of the average discount prior to the repurchase announcement is set out in Figure 4. The discount widens steadily from around -6% five years prior to the announcement to around -17% immediately before the announcement. This indicates very clearly that repurchase announcements in our sample are timed to coincide with a widening discount.

In Figure 5 we set out the cumulative average abnormal fund-price returns for a 30-day period around the announcement date (day -10 to day +20). The middle line relates to all 140 funds, the top line to value funds (being the 70 with the largest discounts) and the bottom line to growth funds (being the 70 with the smallest discounts).[12] We choose the relatively long period of 20 days following the announcement date to measure abnormal changes because fund prices are known to be sticky in relation to new information (Klibanoff, Lamont, and Wizman, 1998).

The middle line for all funds shows that there is a significant price response to the announcement. The average abnormal price returns cumulated from day -10 to day +20

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[12] The discount for the value group averages -22.9%, and for the growth group averages -11.8%. These discounts are measured in the week prior to the announcement.

is 1.30%, of which 1.25% is generated after day 0. Splitting the 140 funds into value and growth groups shows very clearly that it is the value group that responds most to the announcement. The average abnormal price return for the value funds, cumulated from day -10 to day +20, is 2.53% on average, of which 2.46% is generated after day 0. In contrast, the growth group records, on average, an abnormal return of only 0.04% in the 20 days post-announcement, which is not significantly different from zero.

Because the discount is reckoned on the net-asset value rather than on the initial price (and price is smaller than net-asset value if there is a discount), the change in the discount is slightly less than the percentage change in price.[13] From day -10 to day +20 the average discount narrows by 0.8% (from -17.3% to -16.5%), with the discount for the value funds changing significantly by +1.6.% (from -22.9% to -21.3%) and the discount for the growth funds changing insignificantly by +0.2.% (from -11.8% to -11.6%).

In Figure 6, we plot the day +20 cumulative abnormal price return for each fund against the fund's expected price return, the latter being calculated under the assumption that the discount will revert to its initial level after the repurchases (i.e. using Equation (4)). There is a significantly positive relationship between the actual and the expected price returns when all funds are considered (Figure 6 and first row of Table 2). The regression beta of 1.283 is not significantly different from unity, so the impact of the announcement on price is not larger than would be expected from one single repurchase. That is consistent with our first hypothesis. However, there is a large difference in the response of those funds which are trading at large discounts – the *value* funds – from those funds

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[13] Equation (5) defined this for expected changes in the discount.

which are trading at small discounts – the *growth* funds. In the second row of Table 2 we find that the price change for value funds is 2.55 times as large as would be expected from Equation (4) and significantly different from unity at the 1% level. Conversely, the growth funds show a change in price which is only 0.27 times as large as expected (row 3 of Table 2) and not significantly different from zero.

The findings of this section suggest that the short-term impact of a repurchase announcement depends very strongly on the initial discount. For growth funds (trading at small discounts) the repurchase announcement is not a significant event. For value funds (trading at large discounts) the repurchase announcement is an important event which generates much larger price returns than would be expected from the profits to be made and is more consistent with a signal, either that a series of repurchases may be forthcoming or that the management of the fund has improved. Hypothesis 1, that prices jump on announcement in a way which is consistent with short-term profits, cannot be rejected for the average fund, but would be rejected if value funds and growth funds were considered separately.

4.2. Robustness checks on short-term effects

One concern with these results is that the cumulative abnormal returns (CARs) may be due mainly to the constant term estimated for the market-model, Equation (6). We know from Figure 4 that repurchases tend to be made after a long period of widening discounts, so the constant in the market-model regression will be negative to reflect that trend. When it is then used to predict what the price would have been in the absence of a repurchase announcement, the negative price trend will accentuate the estimated impact.

When we plot the cumulative abnormal returns with or without a trend, the effect on the results is extremely small (see Appendix, Figure A1).

A second robustness check on the short-term results is to consider whether the abnormal returns should be estimated relative to the date of the Extraordinary General Meeting (when the repurchase resolution is approved) rather than relative to the earlier announcement date. This confirms that the price effect is located well before the date of the meeting, so the market does recognise the news around the announcement date, which is, on average, 39 days earlier (see Appendix, Figure A2).

4.3. Behaviour of the discount and executed repurchases

Although 140 funds apply for permission to repurchase, not all funds actually make repurchases. Table 3 gives details of the number of funds repurchasing in each of the four years following the first announcement and also gives the percentage of equity repurchased. The typical fund has permission to repurchase up to a maximum of 14.99% of the shares, but the table shows that executed repurchases are only about one third of that amount. Surprisingly, the amounts repurchased by value funds (with large discounts) and growth funds (with small discounts) do not differ significantly in any year. They both repurchase 3-6% of their shares. However, growth funds are a diminishing proportion of all repurchasers as the years pass: 38/77 (49%) in year 1, but only 14/50 (28%) by year 4. We would expect that funds executing repurchases in the relevant year would have larger discounts than those of funds which do not execute repurchases in that calendar year. The data bear this out. The maximum discount experienced by funds which execute repurchases averages -23.0% in the first year following the repurchase announcement whereas the equivalent value for non-executing

funds is -18.7%. This difference is significant at the 1% level (t=3.32). The same pattern arises in each year, as we examine repurchases over four years: executing funds always have significantly more negative discounts than funds which do not go ahead with the buy-back.

We now turn to the change in discount which occurs at the time when the repurchases are executed in the market. We do this by measuring abnormal changes in discounts around the period of the repurchase programme. Specifically, we measure each fund's average discount, relative to an index of discounts, in the 20 days before and 20 days after the repurchase programme in any one year. For the 77 funds that execute repurchases in the first year, the average abnormal change when repurchases are executed is a widening of the discount of -1.38% (see Table 4, row 1). The discount widens somewhat less for value funds (-0.96%) than for growth funds (-1.80%) (where value funds are defined as the 39 of the 77 repurchasers with the largest initial discounts and growth funds defined as the remainder).

The actual profits which are made from executing repurchases in the first year average 0.94% across all executing funds (row 2 of Table 4). They are higher for value funds (1.18%) than for growth funds (0.68%), as would be expected because their shares are being purchased at wider discounts. The second year of the programme, for which there are 65 funds, also shows an average widening of the discount of -0.95% when repurchases are executed (lower part of Table 4), and a repurchase profit of +0.96%. This time the discount widens more for value funds (-1.09%) than for growth funds (-0.68%), but the profits on value funds (+1.13%) once more exceed those on the growth funds (+0.66%).

We obtain an estimate of the total short-run effect for each fund in the first year following the announcement by adding the narrowing of the discount at the time of the announcement to the widening of the discount at the time of the repurchase. The results are given in Table 5. On average, the first cycle of announcement and repurchase leads to an insignificant widening in the discount of -0.514%. However, this average disguises the difference between value and growth funds: for value funds the effect of the first cycle of repurchases leads to the discount narrowing by +0.99%; for growth funds the discount widens by -1.98%.

4.4. Is there an announcement effect in the second year?

All 140 funds which gain permission from shareholders to make a first repurchase also obtain that permission in the second year. As we note above, in no case does a fund which once obtains that permission ever fail to renew it in each year thereafter. Figure 7 plots the CARs around the second AGM for these 140 funds. It suggests that there is a second announcement effect of about 1.25%, being equal in magnitude to the impact of the first announcement. However, we need to be cautious about this result as there may have been other announcements at the AGM which might contaminate the data. Nevertheless, we cannot reject the notion that each year's announcement leads to a new jump in the share price, consistent with Figure 1 of our theoretical development in which myopic shareholders are surprised each year by a new repurchase announcement.

Before turning to the long-term effects, it is useful to summarise the findings on short-term effects. We find an announcement effect on price, which is approximately equal to expectations of a repurchase as a 'one-shot' event. When repurchases are executed, the

net-asset value per share rises, the discount widens again and, on average, returns close to its original level. Value funds show larger effects at the time of announcement than growth funds, so their discounts are reduced by one cycle of repurchases. All of these effects are rather modest given the fact that all of the companies in the sample repeat their repurchase announcements in every succeeding year.

5. Long-term performance

5.1. Long-term performance and profits from repurchases

To estimate the long-run performance, we regress individual fund returns on the Fama/French factors, as given in Equation (7). We use data for periods of 12, 24, 36, and 48 months following the repurchase announcement and include all funds that make an announcement (even if they do not make an actual repurchase). The appropriate benchmark is used for each fund (e.g. UK small-company, UK All-Share, etc.).[14] Two regressions are run for each fund, the first based on price returns and the second based on net-asset-value returns.[15] The average results for the intercepts (alphas), which measure relative performance, are given in Panel A of Table 6.

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[14] We also run the regressions in Panels A and B using the FTSE All-Share Index as a single benchmark and the results are similar to those given (so not reported here).

[15] There are 132 funds available in months 1 to 12 (of the 140 which announced that they would seek the right to repurchase). Of the eight funds which have been removed, five had tender offers (rather than open-market repurchases, one had missing data, one made a new issue of shares and one had a reconstruction. Similar considerations have been used in removing funds from the sample in subsequent periods.

These results are the largest surprise in the whole study because they show that there is significant long-term outperformance following the repurchase announcement, not only in terms of price but also in terms of the underlying portfolio (as represented by the net-asset-value returns). Both price and operating performance increase. The first row of the Table 6 indicates that the price outperforms, on average, by +7.24% in the first year and although this rate of outperformance is not maintained, the average price outperformance is +3.65% per annum over the four years following the announcement. The net-asset value also outperforms, the average being +4.27% in the first year and +3.08% per annum over four years. When the estimates are made with panel data, as reported in Table 6, Panel B, the magnitudes for the first year are the same but a little larger over elapsed periods of two to four years: outperformance of +4.44% per annum for price returns and +3.34% per annum for net-asset-value returns over four years. The t-values in the panel regressions also confirm that these monthly estimates are significantly different from zero at the 1% level.

The magnitude of the long-term price outperformance here is similar to that found in studies of conventional companies: for example, 2.4 % per annum for the US (Ikenberry et al., 1995) and 7% per annum for Canada (Ikenberry et al., 2000). However, we have an advantage in being able to see directly from the market values of the assets (rather than from accounting information) that operating performance also rises. The NAV outperformance of +4.27% in the first year is very similar to that implied by the results in Lie (2005) over four quarters of accounting information on income relative to assets.[16] We are therefore able to reject very clearly, for closed-end funds, the hypothesis of

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[16] In Table 3 of Lie (2005) the extra income relative to assets over four quarters is +0.0021, which at a discount rate of 0.0462 (as used in that paper) leads to a gain in company value of +4.55%.

Grullon and Michaely (2004) that repurchases lead to a re-rating of a company rather than any improvement in performance. This is convincing evidence of improved performance in terms of the value of the fund portfolio.

Earlier in the paper we developed four hypotheses about the kinds of behaviour which might follow a repurchase announcement. In the first and second hypotheses, prices were affected only by the anticipation of profits to be made from the repurchases, either one year's profit (hypothesis 1) or a series of profits (hypothesis 2). As we have data on repurchases made each day and the prices which existed at that time, we are able to compute the profits made from repurchases in each period for each fund and see how they compare with price movements. [17] The second row of Table 6, Panel A, shows that the repurchase profit is, on average, 0.55% per annum in the first year and falls to 0.41% per annum when averaged over four years. These profits are modest when compared with price outperformance over one and four years of +7.24% and +3.65% per annum respectively. In the third row of Table 6, Panel A, these repurchase profits are deducted from the alphas in the first row to give 'net-performance alphas'. These profits from repurchases are far too small to generate the observed long-term effect. For example, the price outperformance after deducting repurchase profits is still +6.68% for one year and +3.24%, on average, over four years. We are therefore able to reject both hypothesis 1 and hypothesis 2. This leaves hypotheses 3 and 4, which propose that prices and

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[17] Percentage profits have been estimated in the following way. For each company, both the amount repurchased and the average discount over the repurchase period have been determined. Under the simplifying assumption that the discount is unchanged, the proportional profit is equal to the estimated proportional price change in Equation (4). Because the discount is assumed constant, the proportional price change is also equal to the proportional change in net-asset value.

operating performance after the announcement are consistent with a signal of a change in the character of the company, as the remaining alternatives to be considered.

Table 7 repeats the analysis of Table 6, but with funds separated into value and growth categories. Panels A and B give the average results across funds and Panels C and D give the results from pooling data in panel regressions. The difference in the outperformance of value funds relative to growth funds is strikingly large. Using the pooled results (Panels C and D), the average price outperformance for value funds is +13.46% in the first year and +7.70% per annum over four years. For growth funds it is only +0.63% in the first year and +1.69% over four years. The average net-asset-value outperformance is also much higher for value funds than for growth funds, +8.98% versus +2.92% over one year and +5.33% versus +1.64% over four years. It is therefore the value funds which enjoy a large positive effect of the repurchase announcement over the long-term, whereas for growth funds the impact is not significantly different from zero.

The extra long-term performance of the value funds is not just due to the closing-up of their larger initial discounts. The difference between the price outperformance over four years (+7.70%) and the net-asset-value outperformance over four years (+5.34%) is a measure of the reduction in the discount, which is +2.36% per annum. This implies that from an initial average discount of -22.7%, the discount on value funds narrows to -16.0% over the four years. The comparable numbers for growth funds are an initial average discount of -11.7% and a final average discount after four years of -10.6%. Fund directors are therefore correct when they assert that repurchases will reduce

discounts (i.e. raise the market-to-book)[18], but this result is conditional on the initial discount being large. The change in discount is also clearly of second-order importance relative to the total price and net-asset-value impacts which occur.

Table 7 also separates-out for value funds and growth funds that part of the extra performance due to the profits generated by the repurchases. The profits are larger in the first year for value funds (+0.69%) than for growth funds (+0.40%), as would be expected from their larger initial discounts. Over four years, however, the repurchase profits for value and growth funds hardly differ, being +0.41% per annum and +0.40% per annum respectively.[19]

We carry out two robustness checks on the above results. The first check uses the Fama and French calendar-time portfolio approach. In this method, a portfolio of companies is formed in calendar-time rather than in event-time. We run a regression of the form given in (7) but use the returns on the FTSE All Share Index instead of the returns on the individual fund-specific benchmarks. In this way the impact of events being clustered in particular periods (and so not being independent) can be addressed (Fama, 1998; Mitchell and Stafford, 2000). The results are given in Table 8 and indicate that there is

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[18] Brav, Graham, Harvey and Michaely (2005) report that, for conventional companies, raising the market-to-book is the predominant motivation for repurchases. A similar motivation is expressed in the annual reports of closed-end funds which seek permission from shareholders to repurchase shares.

[19] It should be noted that the classification into value and growth categories in this table is based on the discount before the first announcement and not updated thereafter.

outperformance in both fund-prices and net-asset values.[20] Note that the horizon for outperformance in this approach is not entirely clear, however, because the composition of a given portfolio changes from month to month, so these results cannot easily be compared with those in Table 7.

The second robustness check yields a more precise estimate of each month's outperformance by using the RATS method which was first proposed by Ibbotson (1975). In this approach an asset-pricing model (the Fama/French three-factor model in our study) is estimated in cross-section for each month in event time. The results for abnormal returns cumulated to 6, 12, 18, 24, 30, 36, 42 and 48 month horizons are given in Table 9.[21]

The cumulative abnormal returns for prices and net-asset values are significant at the 0.1% level at every maturity. It is interesting to note, however, that the impact after 48 months of announcing repurchases is slightly lower (+11.4% for price and +8.9% for net-asset value) than indicated in Panel A of Table 6 (which gives +15.4% for price and 12.9% for net-asset value, when the annual effects are compounded). The effects are also concentrated in the first 24 months, after which there is no further abnormal return.

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[20] We confirm the outperformance in the NAV by repeating the regression using a sample of funds, managed by the same managers, comprising 79 closed-end and 79 open-end funds matched by investment mandate. None of the open-end funds record statistically significant outperformance in any of the four periods. In contrast, the closed-end funds records NAV-outperformance (significant at 5%) for the one year, two year, and four year periods. The outperformance for the three year period is significant at 10%.

[21] We could give results for the cross-section in each month, but the table would be unnecessarily large and not much more informative

Nevertheless, both the RATS cross-sections (Table 9) and the individual time-series (Table 6) are consistent in showing a large impact of announcing repurchases and the results for the first 24 months in the two tables are very similar (+12.7% for price and +10.8% for net-asset value in Table 9, +11.4% for price and +8.7% for net-asset value in Panel A of Table 6).[22]

Completing this section of the paper, our third hypothesis was that announcing a repurchase would signal a change in the character of the company, leading to a much larger impact on prices and operating performance than can be explained by any profits from repurchases. This hypothesis is accepted.

5.2. Do announcing funds that execute repurchases perform better than those that announce but do not execute repurchases?

An interesting question (raised in our fourth hypothesis) is whether the credibility of a repurchase programme depends on executing repurchases, or whether the announcement alone is sufficient to induce the long-term effect on performance. In a study of US companies, Massa, Rehman and Vermaelen (2005) find that if repurchases are motivated by 'mimicking behaviour', rather than by the perceived need to make repurchases due to a low market-to-book, there is no subsequent outperformance. In a similar vein, Lie (2005) finds that there is only an impact on operating performance from a repurchase programme if repurchases are executed. In the present context, we are interested in two questions: (i) whether executing repurchases is critical to boosting the performance of a fund; and (ii) whether such a boost (if any) is found for both value funds and growth

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[22] The results in Panel B of Table 6, which combine cross-section and time-series data, give large values.

funds, because the latter group might be mimickers given their relatively high initial market valuations.

Table 10 compares the performance of funds which execute repurchases with the performance of funds which announce but do not execute repurchases.[23] The results for elapsed periods (such as months 1 to 48) are given in Panel A; in Panel B these results are shown as marginal effects in each year. We begin with price effects. In the first year the funds which execute have a price gain of +3.51%, while funds which do not execute have a much larger price gain of +12.65%. This unexpected result is reversed in the second year, when funds which execute have a positive price gain of +8.97% and non-executing funds record a return of -3.35%. In the third year the executing funds continue to have larger price gains than the non-executing funds. Over the four-year period, executing funds have a small advantage in average price gains: +3.90% per annum for funds which execute repurchases versus +2.70% per annum for non-executing funds.

The impact on operating performance (net-asset-value returns) is similar to that for price, but is less extreme. Operating performance increases by +2.82% in the first year for executing funds and by +6.37% for non-executing funds. This is reversed in the second and third years. Over four years the annual average change in operating performance for executing funds is +3.49% and for non-executing funds is +1.54%. Table 10 also shows

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[23] The number of funds is not the same in each year, as funds move from one category to another and other funds have to be excluded because of lack of data or because they have a change in structure such as a new issue.

that these results are not simply due to profits from repurchases, which average only 0.50% per annum over the four years.

The interpretation of Table 10 is as follows. Funds which announce repurchases but do not execute them in the first year are those funds which perform well in that period and so have no reason to repurchase. This good performance is reflected in a much larger gain in terms of price (+12.65%) than in operating performance (+6.37%). In other words, their portfolios perform well and the share price reacts even more strongly, leading to a narrowing in the discount of about 6%. In the second year the portfolio performance of non-executing funds is flat (-0.89%) and the discount widens by about -4%. By contrast, the funds which execute repurchases do not record such stellar performance in the first year, but then outperform by +14.88% in terms of price and +11.48% in terms of net-asset value in the following two years. For those funds that execute repurchases, the evidence suggests that it takes at least one year for there to be an impact on 'real' performance (of the portfolio).

In short, funds which announce repurchases have agreed an option with their shareholders. Some funds do not exercise the option because they have good performance in the first year. Those funds which do exercise the option enjoy a boost to performance which is 'real' (and not just due to a changing discount), but the boost does not occur as strongly in the first year as in the second. After four years the exercising funds finish slightly ahead of the non-exercising funds, with an annual price outperformance of 3.90% as compared with 2.70%.

We know from Table 10 that there are only small differences in performance in the four years after the announcement between those funds which execute repurchases and those funds which do not. The evidence is therefore not consistent with our original hypothesis 4, in which the first group was hypothesised to outperform the second. Nevertheless, the study by Peyer and Vermaelen (2005) suggests that we need to consider what happens to the companies in the period before the announcement because we may then find that there was outperformance relative to expectations. To do this, Table 11 compares the performance of executers / non-executers in the 48 months before the announcement and in the 48 months after the announcement.[24]

In the four years before the repurchase announcement – Table 11, column 1 for price performance and column 4 for net-asset-value performance – there are some significant differences between executing funds and non-executing funds. We start by considering all funds (bottom third of Table 11). Before the repurchase announcement, the executing funds perform significantly worse than the non-executing funds at the 0.1% significance level, both in terms of price (-4.552% per annum) and in terms of net-asset-value (-5.152% per annum). Considering value and growth funds separately, the magnitudes by which executing funds perform worse in the pre-announcement period are similar for the two categories, but only reach significance for the net-asset-value performance of value funds which is -5.255% per annum.

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[24] We choose 48 months in order to have sufficient periods for reliable estimates of alphas. The returns in the table have been annualised linearly (rather than compounded), as this avoids inconsistencies in statistical tests and also in measuring differences, which would not add-up if returns had been compounded.

In the four years after the repurchase announcement (Table 11, column 2 for price and column 5 for net-asset value), the performance of executing funds is better than for non-executing funds, but the difference only borders on statistical significance for net-asset-value returns (+1.66% per annum difference, t = 1.73) and is not significant for price returns. This is the same result as we have in Table 10 (in a compounded form).

Finally, if we consider changes **between** the four years before the announcement and the four years afterwards (Table 11, columns 3 and 6), there are large and significant differences between executing funds and non-executing funds. For all 103 funds, the differences related to executing are +5.372% per annum for prices and +6.811% per annum for net-asset-values (both 0.1% significant). The changes are of similar magnitude for value funds and growth funds, but are statistically significant only for the value funds (+6.985%, significant at the 5% level).

The conclusion from Table 11 is that whether or not a fund executes its announced repurchases has only a small impact on post-announcement performance. It is bad performance (in terms of either price or net-asset-value) in the pre-announcement period which distinguishes executing funds from non-executing funds.[25] The funds which go ahead and execute repurchases are those funds with bad performance before the announcement, not just in terms of price but also in terms of net-asset-value.

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[25] Peyer and Vermaelen (2005) find a rebound in terms of price for announcing companies in the US, when comparing 6-months before the announcement with 4-years after the announcement. They do not examine whether execution of repurchases is critical to this.

We started this section with two questions. The first was whether making an actual repurchase of shares was critical to adding value for a fund. The answer is positive: it is critical, but only for those funds which perform badly in the previous four years. The second question concerned differences of performance between value funds and growth funds in relation to actual repurchases. We find that there is little difference in this regard.

The results suggest that after a period of bad performance, the directors decide that action is needed and that the repurchase announcement is a signal of their determination to improve the performance of the company. In the next section of the paper, we consider some preliminary evidence which suggests that there are changes in the corporate governance of those funds which announce repurchases.

5.3. Repurchases and governance

There appears to have been no previous study of whether the long-term outperformance following repurchases might be related to changes in governance. A complete analysis of governance and repurchases is beyond the scope of the present study and requires a larger sample than the number of funds available.[26] Nevertheless, we are able to carry-out some preliminary tests.

There are two questions to be answered. First, are funds which have better governance more likely to announce repurchase programmes? Second, is the long-term

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[26] A recent study of corporate governance for UK closed-end funds (Gemmill and Thomas, 2006), shows that funds perform better if they have: smaller boards, a larger proportion of independent directors, and some degree of ownership by the managers.

outperformance of funds which make repurchases related to improved governance? In relation to the probability of repurchasing, we combine the data in Gemmill and Thomas (2006) with those used in the current study to obtain a sample of 144 funds over years 1997 to 2000, comprising 95 which make a repurchase announcement and 49 which do not.[27] Using a logit methodology, we find that the propensity to make a repurchase announcement (for the first time) is positively and significantly (1% level) related to two fund characteristics: a large fund and a small board. Other variables which might have been expected to have an influence, such as the degree of independence of directors or the size of the discount, do not have an effect.

To address the second question, of whether governance is related to outperformance, we compare the board characteristics of the 10 funds which had the largest rebound in operating performance (net-asset value) from the four years before the repurchase announcement to the four years thereafter, with the 10 funds which had the smallest rebound in operating performance over the same period. We examine whether the good and bad performers have different turnovers of individual fund directors. This is an extremely small sample, so strong conclusions are unlikely to be reached. Nevertheless, there is evidence that the turnover in non-executive directors over the 8 years is significantly higher for the high performers (42 changes) than it is for the low performers (15 changes).[28] The conclusion is therefore that changed governance may be the factor which leads to long-term outperformance of funds which repurchase their shares. A more extensive study is needed to confirm this result.

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[27] The data on board and ownership characteristics are from 1997.

[28] A chi-squared test confirms that these samples are drawn from different distributions, with a significance level of 2.5%

5.4. Changes in liquidity

A final alternative to be tested is whether announcements or actual repurchases improve liquidity in the shares, which in turn causes the long-term price and operating-performance effects. We estimate the average quoted bid/ask spread for each fund in three periods: 20 days before start of the repurchase programme for the year, during the period of repurchases, and 20 days after completion of the repurchase programme for that year. This is done for those funds which executed repurchases in each of the first three years following the initial announcement (i.e. total funds numbering 77, 65, and 60 respectively). The results are shown in Figure 8.

The quoted bid/ask spread for the funds is, on average, about 1.5% and does not change significantly across the 'before', 'within' and 'after' periods. There is no indication that there is a downward trend in the bid/ask spread over the three years, but rather a trend to higher spreads. We can therefore reject the hypothesis that a change in liquidity has a positive long-term impact on performance. This result contrasts with that of Cook, Krigman, and Leach (2004) and of Eberhart and Siddique (2004), who argue that liquidity is the only significant factor affecting returns around repurchases.

6. Conclusions and implications

Our results indicate distinctly different short-term and long-term impacts of repurchases on closed-end funds. In the short-term, the announcement of a repurchase programme leads to an increase in price which is about equal to the arbitrage profit which can be expected from a one-shot programme. The rise in price causes the discount to narrow at

the time of announcement, but this effect is reversed (and the discount widens again) when the actual repurchases are made.

In the long-term, the average closed-end fund which makes an initial repurchase announcement outperforms its benchmark. This outperformance over the following four years amounts to 4% per annum in terms of price and (most surprisingly) 3% per annum in terms of operating performance (net-asset value). The difference between the price effect and net-asset-value effect is due to an increase in the market-to-book, i.e. a reduction in the discount of about 1% per annum. Most of this long-term post-announcement outperformance is achieved by value companies rather than by growth companies, which parallels what happens to prices at the time of the repurchase announcement. Profits from repurchases are far too small (0.5% per annum) to be the main cause of the long-term effects.

Post-announcement outperformance is not affected much by whether actual repurchases are executed or not, but if the change in performance is considered relative to the four years before the announcement then a different conclusion is reached. There is a remarkable turnaround for funds which execute repurchases, of about +5.5% per annum in terms of price and about +7.0% per annum in terms of net-asset value. The bad performers in the four years before the announcement then execute repurchases and become good performers in the four years after the announcement.

We reject the argument of Grullon and Michaely (2004), based on US data, that repurchases do not improve company performance. Lie (2005) shows that there is an improvement in the post-announcement operating performance for US companies, if

performance is measured relative to expectations. We also find that the operating performance improves significantly for all announcing companies. In particular, we find that those funds that execute repurchases show a remarkable turnaround. While Peyer and Vermaelen (2005) also report a rebound in terms of price, we show that this rebound also occurs for operating performance. We reject the hypothesis (made by Cook, Krigman, and Leach (2004) and by Eberhart and Siddique (2004)) that the price gain is just a liquidity effect, as we find that bid/ask spreads are not affected by a repurchase programme.

Our results for the short-term are consistent with the arbitrage theory of repurchases (i.e. market timing), in which the profits from repurchases are the drivers of both fund-prices and net-asset values. Our results for the long-term are consistent with the signalling theory of repurchases, in which the character of the company has changed. Although the precise information being signalled is not clear, we think that it is likely to be an improvement in the quality of management. The act of repurchasing shares is against the interest of the managers because management fees will fall. Announcing repurchases and then being prepared to execute them, if necessary, is a credible signal that the directors have asserted their authority over the fund-management company. Investors do not notice this improvement in management until the fund starts to perform better, leading to a delayed response in terms of the share price and net-asset value. Although we have only been able to assemble some preliminary evidence in support of this governance theory of repurchases, we think that it is a plausible explanation which deserves to be tested on a much larger sample of conventional companies.

Finally, our study confirms the view of directors of closed-end funds that repurchases reduce the discount, albeit by a small amount. Directors might, however, be surprised to learn that the main effect of repurchases is not directly connected to the arbitrage profits from repurchases, but appears to be due to an improvement in their own supervision of the fund-management company.

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Table 1

Example of the Effects of a Repurchase Programme

Time	Number of shares	Value of assets	NAV per share	Premium (discount)	Price per share
Before the announcement	10,000	$100,000	$10	-10%	$9.00
After the announcement but before actual repurchases are made	10,000	$100,000	$10	-9.09%	$9.091
After the re-purchase of 1,000 shares	9,000	$90,909	$10.101	-10%	$9.091

The table illustrates the potential impact of repurchasing 10% of the fund's equity, assuming that the discount remains constant at 10% pre- and post-repurchase.

Table 2

Results from Regressing Actual Percentage Change in Price Against Expected Change in Price (from Equation (4))

	Alpha	Beta	R^2
All funds (140 funds)	-0.021	1.283	0.09
(t-stat)	(-2.07) *	(3.65) ***	
Value	-0.066	2.547	0.10
(70 funds)	(-2.00) *	(2.81) **	
Growth	-0.040	0.272	0.01
(70 funds)	(-0.35)	(0.44)	

The table gives the estimated coefficients from running a regression of the day +20 cumulative abnormal share-price returns (after the initial repurchase announcement) against the expected share-price returns. The expected share-price returns are computed from equation 4, under the assumption that the long-term discount is constant. *, **, and *** indicate significance at the 5%, 1% and 0.1% levels respectively.

Table 3

Percentages of Equity Repurchased in Years 1-4 by Funds Announcing in Year 1 and Repurchasing in theYear Shown

Period	Percentage of Equity Repurchased		
	All Funds	**Value Funds**	**Growth Funds**
Year 1	4.96% (77 funds)	5.56% (39 funds)	4.43% (38 funds)
Year 2	5.44% (65 funds)	5.65% (34 funds)	5.22% (31 funds)
Year 3	3.55% (60 funds)	3.79% (41 funds)	3.02% (19 funds)
Year 4	4.36% (50 funds)	4.04% (36 funds)	5.20% (14 funds)

The table gives the percentage of equity actually repurchased in the four years following the first repurchase announcement. The allocation to value and growth categories is based on the median discount for all existing funds (and not just those that actually repurchase) one week before the first announcement (in year 1) and one week before the AGM in later years.

Table 4

The Impact of Executing Repurchases in Terms of Changes in Discounts and in Terms of Profits Made

Year 1 of repurchase programme	All (77 funds)	Value (39 funds)	Growth (38 funds)
Average abnormal widening of discounts	-1.38%	-0.96%	-1.80%
Average profit on repurchases	+0.94%	+1.18%	+0.68%
Year 2 of repurchase programme	(65 funds)	(42 funds)	(23 funds)
Average abnormal widening of discounts	-0.95%	-1.09%	-0.68%
Average profit on repurchases	+0.96%	+1.13%	+0.66%

The table gives averages across funds, at the time of actual repurchases, for the abnormal widening of the discount and for the profits made on those repurchases. The upper half of the table gives the results for the first year of repurchases and the lower half of the table gives the results for the second year of repurchases. Results are given for all funds together (column 1) and separately for value funds (column 2) and for growth funds (column 3). The value and growth categories in this table are based on the discount at the time of the first repurchase announcement.

Table 5

Announcement, Repurchase and Total Effects on Discounts in the First Repurchase Cycle

	All funds	Value funds	Growth funds
Announcement effect	0.861%	2.138%	-0.382%
Repurchase effect	-1.376%	-1.147%	-1.599%
Total effect: discount widens (-), narrows (+)	-0.514%	+0.991%	-1.981%

The table gives average results on discount effects for the subset of funds which go ahead and execute repurchases in the first year after the announcement. There are separate columns for all funds together (column 1), for value funds (column 2), and for growth funds (column 3). Row 1 gives the 20-day announcement effect on the discount. Row 2 gives the repurchase effect on the discount. Row 3 sums the announcement and repurchase effects to give the total effect on the discount, in this first year.

Table 6

Estimates of Outperformance Alphas in percent for Fund Price-Returns and Fund NAV
Returns Over the Long-Term, Using the Fama/French Model

Panel A (average values)								
	Months 1-12		Months 1-24		Months 1-36		Months 1-48	
	132 funds		122 funds		110 funds		106 funds	
	Price	NAV	Price	NAV	Price	NAV	Price	NAV
Average regression alpha	7.238	4.269	5.561	4.244	4.244	3.548	3.648	3.079
Profits from repurchases	0.553	0.553	0.493	0.493	0.421	0.421	0.409	0.409
Net-performance alpha	6.684	3.716	5.068	3.751	3.824	3.128	3.239	2.670
Panel B (pooled panel data)								
	Months 1-12		Months 1-24		Months 1-36		Months 1-48	
	1589 fund months		3142 fund months		4579 fund months		6020 fund months	
	Price	NAV	Price	NAV	Price	NAV	Price	NAV
Regression alpha	6.485	5.877	6.676	5.548	5.523	4.107	4.444	3.338
(t-stat)	(2.93)	(3.37)	(4.46)	(4.63)	(4.78)	(4.50)	(4.66)	(4.48)

The table gives estimates of fund price and net-asset-value outperformance, based on the
Fama/French 3-factor model. The estimates in Panel A are averages from time-series
across the relevant funds, with each fund having its own sector-specific benchmark. The
estimates in Panel B are based on a panel (cross-section/time-series) regression in which
each fund is separately identified and the FT All-Share Index is used as the benchmark.
The other risk-factors are the conventional size (SMB) and market-to-book (HML)
factors. The returns are measured over four time intervals (12, 24, 36, and 48 months)
following the initial repurchase announcement. In Panel A the first numeric row gives
the average alpha from the regression. The second numeric row gives the average profit
made from repurchases. The third numeric row deducts the profits from the alpha, to
give a 'net-performance' alpha which is independent of profits from repurchases. In
Panel B the first numeric row is the alpha and the second numeric row is the t statistic.
Each table entry is based on monthly data and has been compounded to give an
annualised percentage.

Table 7

Value Funds and Growth Funds: Estimates of Outperformance Alphas in percent for Fund Price-Returns and Fund NAV Returns Over the Long-Term, Using the Fama/French Model

Panel A -- VALUE funds (average values)								
	Months 1-12		Months 1-24		Months 1-36		Months 1-48	
	67 funds		58 funds		48 funds		47 funds	
	Price	NAV	Price	NAV	Price	NAV	Price	NAV
Average regression alpha	12.509	7.609	8.563	5.246	6.523	4.744	5.801	4.457
Profits from repurchases	0.686	0.686	0.505	0.505	0.421	0.421	0.409	0.409
Net-performance alpha	11.822	6.923	8.058	4.741	6.102	4.323	5.392	4.048

Panel B – GROWTH funds (average values)								
	Months 1-12		Months 1-24		Months 1-36		Months 1-48	
	65 funds		64 funds		62 funds		59 funds	
	Price	NAV	Price	NAV	Price	NAV	Price	NAV
Average regression alpha	2.035	0.928	2.894	3.350	2.500	2.635	1.961	1.998
Profits from repurchases	0.397	0.397	0.469	0.469	0.421	0.421	0.397	0.397
Net-performance alpha	1.638	0.531	2.425	2.881	2.079	2.214	1.565	1.601

Panel C -- VALUE funds (pooled panel data)								
	Months 1-12		Months 1-24		Months 1-36		Months 1-48	
	810 fund mths		1558 fund mths		2219 fund mths		2888 fund mths	
Regression alpha	13.461	8.978	10.664	7.097	9.211	5.952	7.699	5.334
(t-stat)	(3.73)	(3.08)	(4.64)	(3.77)	(5.22)	(4.14)	(5.26)	(4.55)

Panel D – GROWTH funds (pooled panel data)								
	Months 1-12		Months 1-24		Months 1-36		Months 1-48	
	779 fund mths		1584 fund mths		2360 fund mths		3132 fund mths	
Regression alpha	0.626	2.918	2.906	3.871	2.145	2.353	1.693	1.644
(t-stat)	(0.24)	(1.50)	(1.51)	(2.57)	(1.43)	(2.05)	(1.37)	(1.78)

The table gives estimates of fund price and net-asset-value outperformance, based on the Fama/French 3-factor model, with results separated into Value and Growth categories. The estimates in Panels A and B are averages for Value and Growth funds from time-series across the relevant funds, with each fund having its own sector-specific benchmark. The estimates in Panels C and D for Value and Growth funds are based on a panel (cross-section/time-series) regression in which each fund is separately identified and the FT All-Share Index is used as the benchmark. The other risk-factors are the conventional size (SMB) and market-to-book (HML) factors. The returns are measured over four time intervals (12, 24, 36, and 48 months) following the initial repurchase announcement. In Panels A and B the first numeric row gives the average alpha from the regression. The second numeric row gives the average profit made from repurchases. The third numeric row deducts the profits from the alpha, to give a 'net-performance' alpha which is independent of profits from repurchases. In Panels C and D the first numeric row is the alpha and the second numeric row is the t-statistic. Each table entry is based on monthly data and has been compounded to give an annualised percentage.

Table 8

Monthly Price Outperformance for All Announcing Funds, Based on the Calendar-Time Portfolio Approach of Fama and French

	Rule for Inclusion of a Fund in the Portfolio			
	Announcement over last 12 months	Announcement over last 24 months	Announcement over last 36 months	Announcement over last 48 months
Monthly price outperformance in percent	0.883%	0.707%	0.618%	0.584%
t-value	2.63**	2.56*	2.62**	2.75**
Monthly net-asset-value outperformance in percent	0.797%	0.625%	0.491%	0.477%
t-value	3.20**	2.74**	2.47*	2.65**
Number of monthly observations	103	111	111	111

The table reports monthly price and net-asset-value outperformance of equally-weighted calendar-time portfolios using the return on the FTSE All Share Index, SMB, and HML factors as independent variables. Four separate calendar-time portfolios are examined, inclusion of a fund being based on how recently it made its first repurchase announcement. The numeric columns 1 to 4 give results for portfolios including funds making announcements within the last 12, 24, 36 and 48 months respectively. The first two numeric rows give results for price returns. The third and fourth numeric rows give results for net-asset-value returns. The fifth numeric row gives the number of monthly observations available for the relevant portfolio. The weighting used is the square root of the number of funds in the portfolio in a month. *, **, and *** indicate significance at the 5%, 1%, and 0.1% levels respectively.

Table 9

Monthly Outperformance for All Announcing Funds, Based on the Cross-Section Methodology (RATS) and the Fama/French Model

Months for cumulation of cross-sections	CAR for price	t-value	CAR for net-asset value	t-value
(+1,+6)	4.234%	6.46 ***	3.375%	6.65 ***
(+1,+12)	5.770%	9.32 ***	5.101%	10.35 ***
(+1,+18)	11.306%	17.67 ***	9.826%	19.20 ***
(+1,+24)	12.754%	20.62 ***	10.786%	21.62 ***
(+1,+30)	11.235%	18.24 ***	10.003%	20.37 ***
(+1,+36)	11.203%	18.68 ***	9.310%	19.57 ***
(+1,+42)	11.903%	20.01 ***	8.971%	19.35 ***
(+1,+48)	11.422%	19.62 ***	8.867%	19.68 ***

The table reports price and net-asset-value outperformance based on regressions across time and securities (RATS). The dependent variable in each cross-section regression is either the price-return of each fund or the net-asset-value return of each fund. The independent variables are: fund-specific benchmark returns, the size factor (SMB) and the book-to-market factor (HML). The numbers reported are the cumulative sums of the intercepts α_t of the cross-sectional regressions over the post-repurchase-announcement event periods. In order to abbreviate the table, we report cumulative abnormal returns only at 6-monthly intervals (6, 12, 18, 24, 30, 36, 42 and 48 months). *, **, and *** indicate significance at the 5%, 1%, and 0.1% levels respectively.

Table 10

Estimates of Outperformance for Funds which Execute Repurchases and for Funds which Do Not Execute Repurchases

PANEL A Elapsed years	Months 1-12			Months 1-24			Months 1-36			Months 1-48		
	no.	price	NAV	no.	price	NAV	no.	price	NAV	no.	price	NAV
Executing funds	77	3.510	2.820	82	6.054	5.012	80	4.727	4.235	84	3.902	3.486
Profits from repurchases	77	0.936	0.936	82	0.728	0.728	80	0.582	0.582	84	0.505	0.505
Executing less profits	77	2.574	1.884	82	5.327	4.285	80	4.145	3.652	84	3.396	2.980
Non-executing funds	55	12.652	6.374	40	4.457	2.688	30	2.951	1.734	22	2.701	1.541
PANEL B Individual years	Months 1-12			Months 13-24			Months 25-36			Months 37-48		
	No.	price	NAV	no.	price	NAV	no.	price	NAV	no.	price	NAV
Executing funds	77	3.510	2.820	82	8.965	7.456	80	2.387	2.974	84	1.681	1.439
Profits from repurchases	77	0.936	0.936	82	0.524	0.524	80	0.287	0.287	84	0.290	0.290
Executing less profits	77	2.574	1.884	82	8.441	6.932	80	2.100	2.687	84	1.391	1.150
Non-executing funds	55	12.652	6.374	40	-3.350	-0.894	30	-0.183	-0.156	22	2.133	1.014

The table reports on the difference in outperformance between funds which both announce and execute repurchases and those that only announce repurchases but do not execute them. Panel A gives the average annualised price and net-asset-value outperformance in the elapsed 12, 24, 36 and 48 month periods following the repurchase announcement. Separate data are shown for those funds which announce and execute repurchases (executing funds) and for those which only make a repurchase announcement (non-executing funds). The profits from repurchases for those funds which execute repurchases are computed as the percentage of the equity repurchased multiplied by the discount immediately before the repurchase announcement and averaged over the funds repurchasing in that time interval. Panel B gives results which are presented in the same format as in Panel A, but the effects are now analysed over the four individual 12-month time-periods.

Table 11

Comparison of Outperformance for Funds Which Do and Funds Which Do Not Execute
Repurchases, Four Years Before versus Four Years After Announcement
(non-compounded annual average return in percent)

Sample	Sub-sample	Alphas for Price Returns			Alphas for NAV Returns		
		BEFORE Months -48 to –1	AFTER Months +1 to +48	CHANGE	BEFORE Months –48 to –1	AFTER Months +1 to +48	CHANGE
VALUE Funds	**Executing value funds** N=36	-3.552 (1.580)	5.592 (1.624)	9.144 (2.177)	-0.130 (1.544)	4.495 (1.477)	4.625 (1.919)
	Non-executing value funds N=9	1.934 (2.527)	5.420 (1.676)	3.487 (3.530)	5.557 (2.083)	3.197 (1.288)	-2.364 (2.764)
	Difference executing/non-executing	-5.486 t=1.840	0.172 t=0.074	5.658 t=1.364	**-5.255 t=2.193 ***	1.298 t=0.662	**6.985 (2.076) ***
GROWTH Funds	**Executing growth funds** N=46	-1.064 (1.218)	2.185 (1.187)	3.250 (1.853)	1.006 (1.028)	2.376 (1.069)	1.372 (1.489)
	Non-executing growth funds N=12	2.742 (3.050)	0.942 (2.898)	-1.800 (5.270)	5.734 (2.672)	0.484 (2.808)	-5.250 (5.285)
	Difference executing/non-executing	-3.805 t=1.158	1.244 t=0.397	5.050 t=0.904	-4.728 t=1.379	1.894 t=0.630	6.622 t=1.206
ALL Funds	**Executing all funds** N=82	-2.156 (0.978)	3.682 (0.986)	5.838 (1.441)	0.506 (0.887)	3.306 (0.886)	2.800 (1.193)
	Non-executing all funds N=21	2.395 (2.006)	2.861 (1.835)	0.466 (3.348)	5.658 (2.027)	1.646 (1.688)	-4.012 (3.192)
	Difference executing/non-executing	**-4.552 t=4.249 *****	0.820 t=0.770	**5.372 t=3.325 *****	**-5.152 t=5.199 *****	1.661 t=1.731	**6.811 t=4.933 *****

The table gives the estimated outperformance for different categories of fund in two
distinct periods: 48 months before announcement and 48 months after announcement.
The categories of fund are Value (top third of table), Growth (middle third of table) and
All (bottom third of table) and within each of these the funds have been separated into
those which execute repurchases and those which do not execute repurchases, with the
difference between executing/non-executing funds also being given.   Each entry in the
table is an annual average in percent for outperformance (alpha) for a particular group
(e.g. VALUE funds which buy their own shares constitute one such group). The return
is calculated as twelve times the monthly average for the group, estimated from
individual time-series for each fund with the Fama/French equation. The numbers of
funds are given in the second column. There are 103 funds in total for which there is a
full set of data 48 months prior and 48 months after the repurchase announcement. The
numbers in brackets are standard errors. For differences, t-values are given as 't = '.
Significant t-values are in bold type. *, **, and *** denote significance for differences
at   the   5%,   1%,   and   0.1%   levels   respectively.

Figure 1

The Behaviour of Prices Implied by the Example of One-period Arbitrage
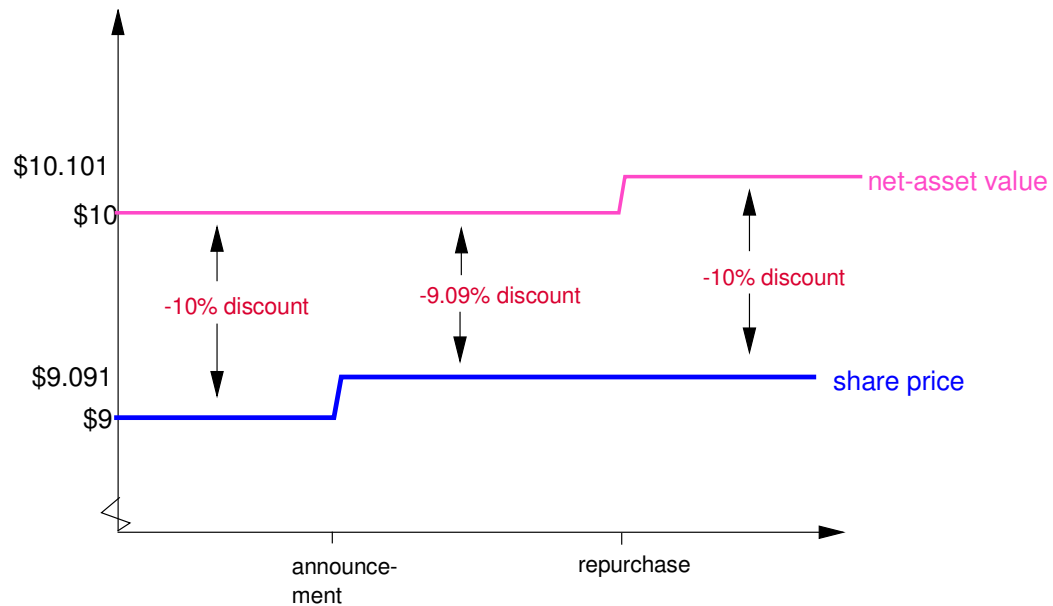
The figure illustrates how a 10% repurchase of the fund's shares causes the share price to jump upwards at the announcement date (lower line) and the net-asset value to jump upwards at the execution date (upper line). The discount at first narrows to 9.09%, then widens again to the original 10% level.

Figure 2

Net-asset Value per Share, Price per Share and Discount When Investors Anticipate a Series of Profits from Repurchases
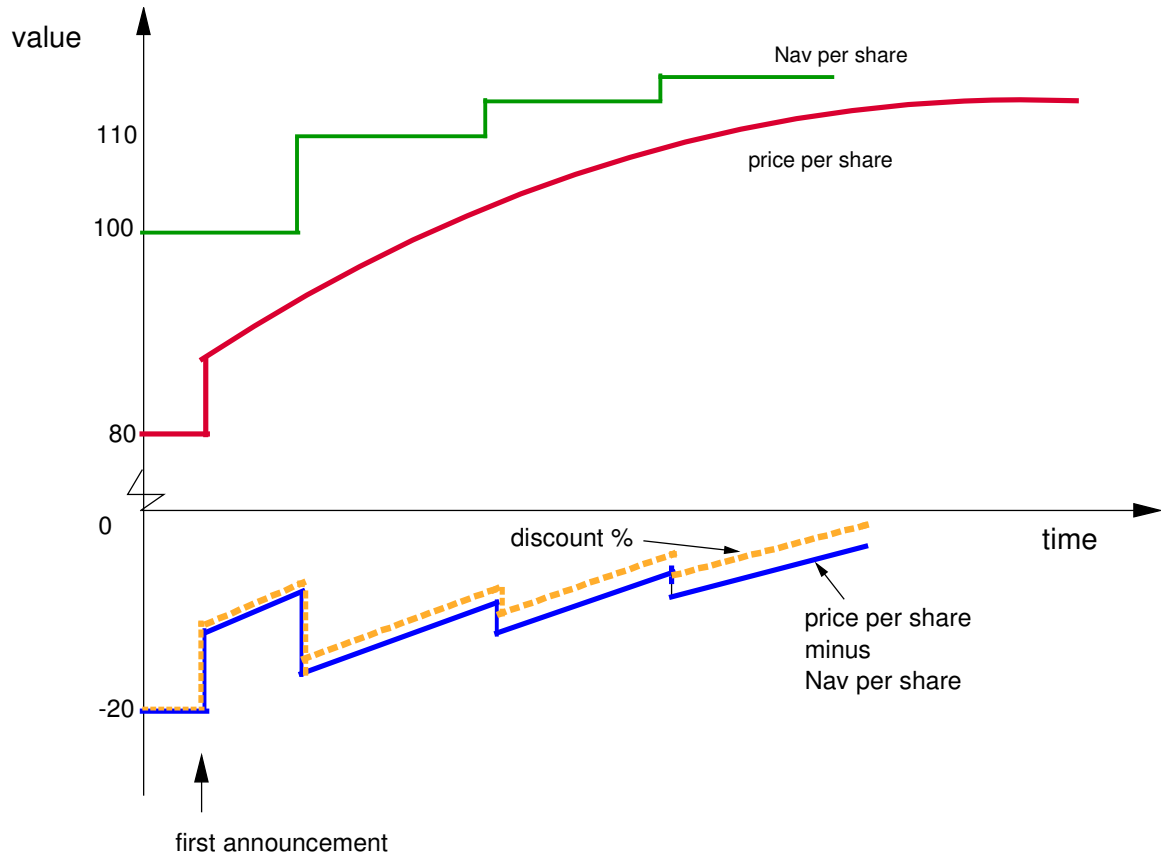
The upper part of the diagram illustrates the path of the net-asset value, which increases stepwise as profits from repurchases are realised. The price per share increases at the time of the initial announcement and drifts up through time towards a target level of discount. In the lower part of the diagram, the solid line illustrates the difference between price per share and net-asset-value per share and the dotted line expresses this difference as the discount to net-asset-value.

Figure 3

NAV per Share and Price per Share Under the Governance Theory of Repurchases
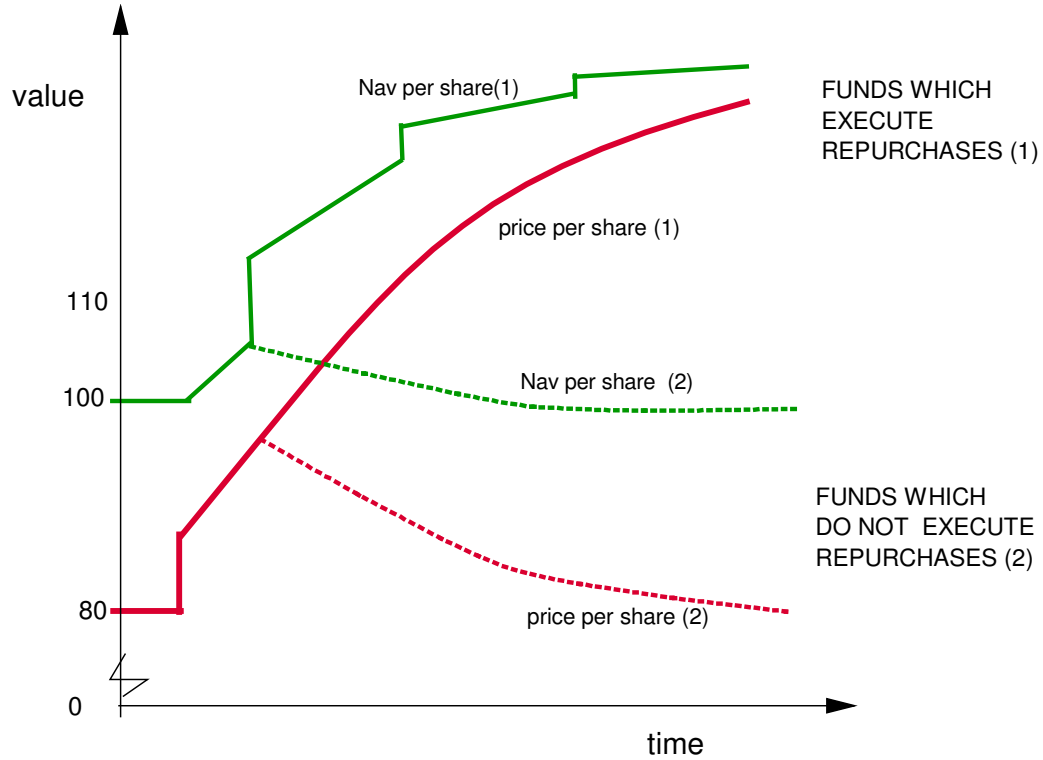
The diagram illustrates two potential paths for the price per share and net-asset-value per share, depending on whether repurchases are executed. The solid upper lines, denoted (1), illustrate what happens if repurchases are executed and the dotted lower lines, denoted (2), illustrate what happens if no actual repurchases are made.
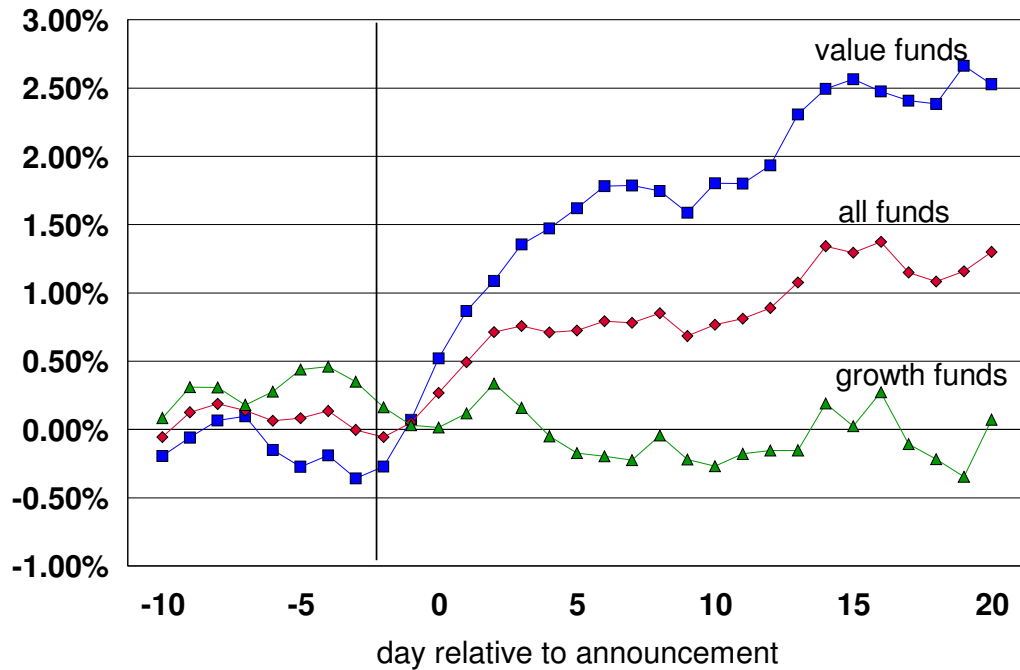
Figure 4

Average Discount for 140 Announcing Funds Before and Immediately After the Announcement
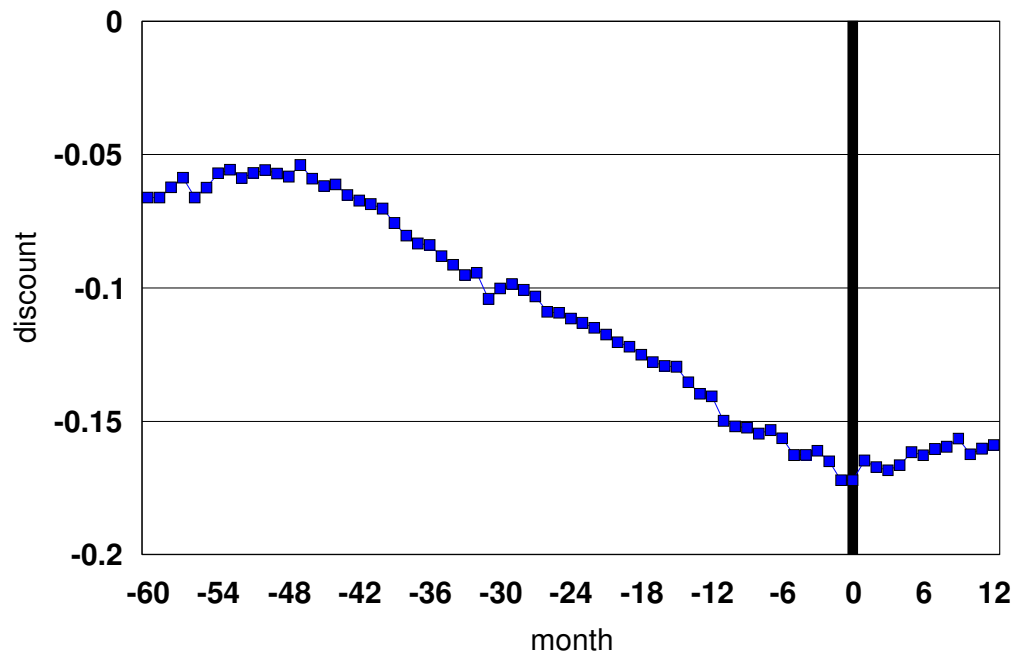
The figure gives the average discount for the 140 funds for the period -60 months to +12 months, where month 0 is the date of the initial announcement of a repurchase. The sample is from 1996-2004.

Figure 5

Cumulative Abnormal ReturnsAround the Announcement Date

The figure gives the cumulative abnormal share-price returns over the period day -10 to day +20, where day 0 is the date of the initial repurchase announcement. The abnormal returns are computed as the average share-price returns for the 140 funds less the expected share-price returns. The expected share-price returns are computed from a market-model regression (equation 6) which relates the price returns to the net-asset-value returns over the previous 52 weeks. In the figure the 140 funds are divided into Value (high book-to-market) and Growth (low book-to-market) categories on the basis of the discount which existed one week before the initial announcement.
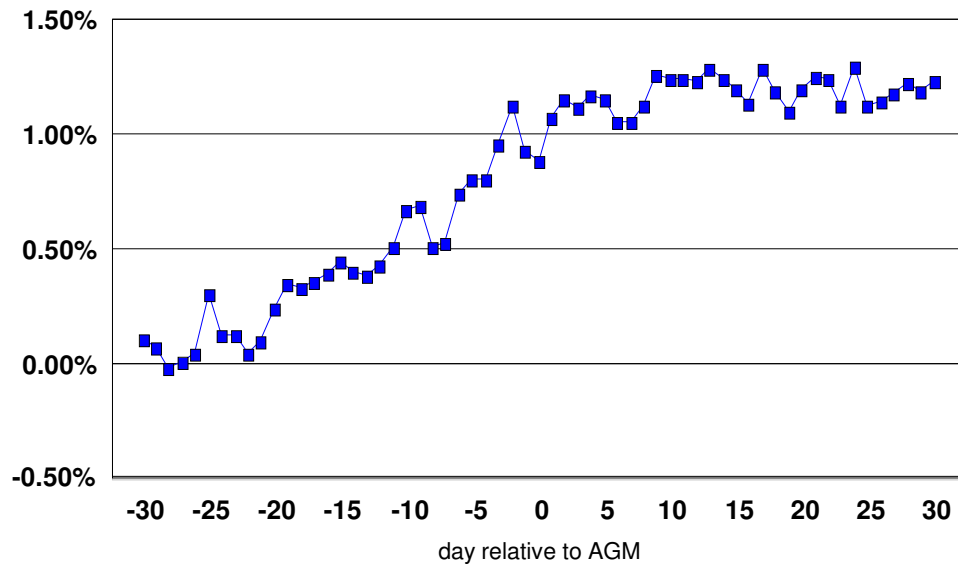
Figure 6

Actual and Expected Percentage Changes in Price at Announcement Time
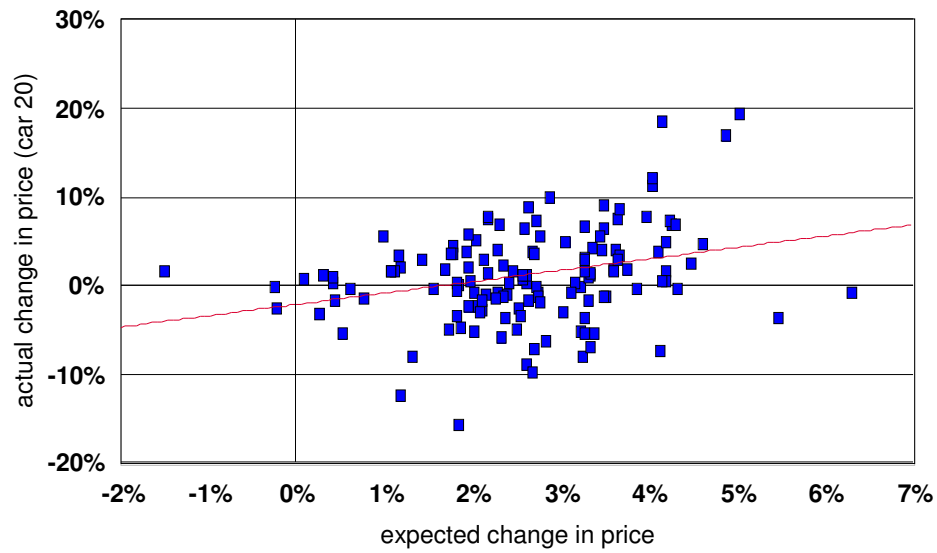
The figure plots the day +20 cumulative abnormal share-price returns after the initial repurchase announcement against the expected share-price returns. The expected share-price returns are computed from equation 4, under the assumption that the long-term discount is constant.
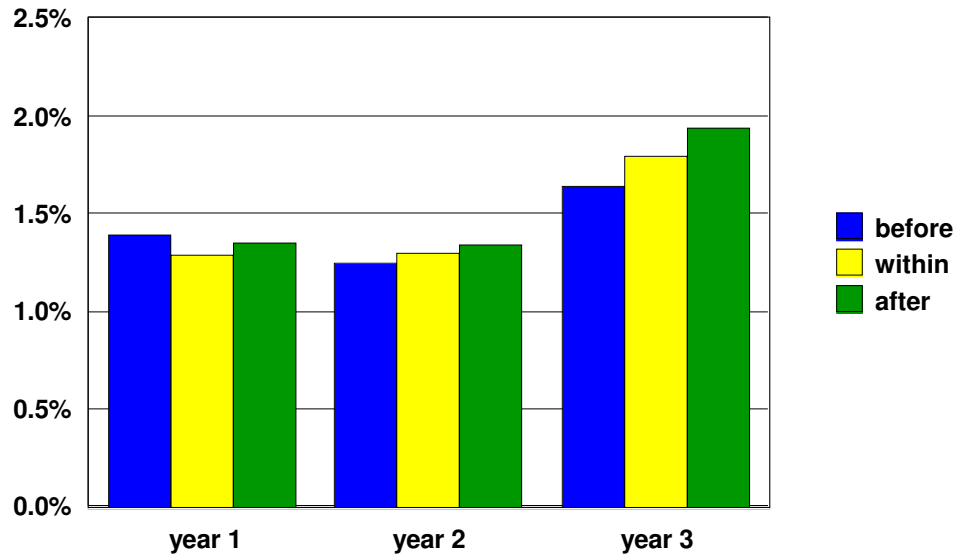
Figure 7

CARs Around Second AGM for 140 Funds (All of Which Announce a Second Repurchase Programme)

The figure gives the cumulative abnormal share-price returns over the period day -30 to day +30, where day 0 is the date of the second AGM at which there was a repurchase announcement. The abnormal returns are computed as the average share-price returns for the 140 funds less the expected share-price returns. The expected share-price returns are computed from a market-model regression (equation 6) which relates the price returns to the net-asset-value returns over the previous 52 weeks. The intercept term (alpha) from the regression has been set to zero, in order to avoid the effect of any trend established after the previous year's announcement.
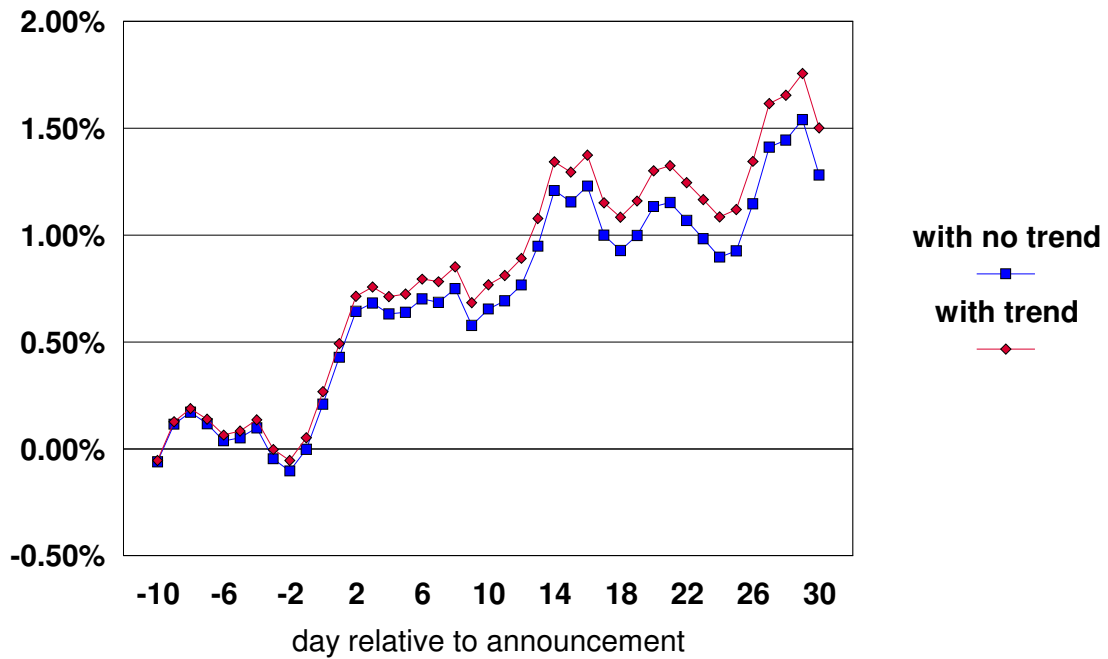
Figure 8

Average Bid/Ask Spreads for Periods Around Executed Repurchases

The figure gives average bid-ask spreads for those funds that executed repurchases in the 1st, 2nd and 3rd years following the initial repurchase announcement. The spreads are computed for three periods in each year: over the 20-day period before the start of the repurchase programme for that year; over the duration of the repurchase programme for that year; and over the 20-day period following the completion of the repurchase programme for that year.
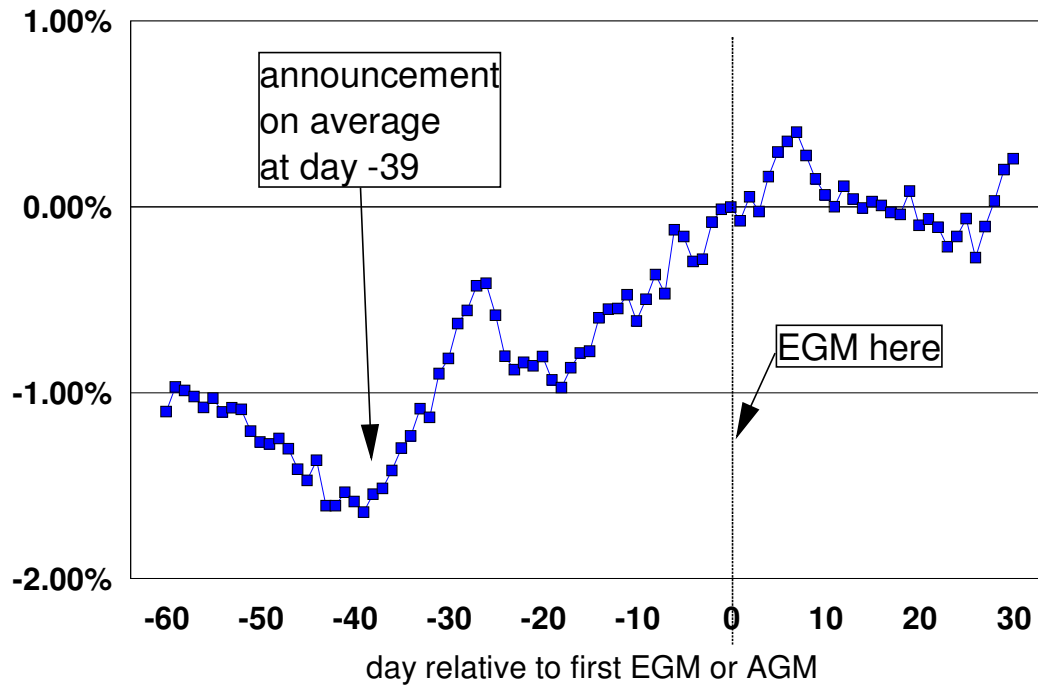
Figure A1   Cumulative Abnormal Returns from the Announcement, with and
             without a Trend

The figure gives the cumulative abnormal share-price returns over the period day -10 to
day +30, where day 0 is the date of the initial repurchase announcement. The upper plot
assumes that the trend of the last 52 weeks continues when computing expected returns
and the lower plot assumes that there is no trend.

Figure A2

Cumulative Abnormal Returns Relative to the Date of Shareholders' Meeting

The figure gives the cumulative abnormal share-price returns over the period day -10 to day +30, where day 0 is the date of the General Meeting, Extraordinary or Annual (EGM or AGM), at which a vote was taken to initiate a repurchase programme for the first time.